JULY/AUGUST 1996

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WINEGROWING ▲ WINEMAKING ▲ WINEMARKETING

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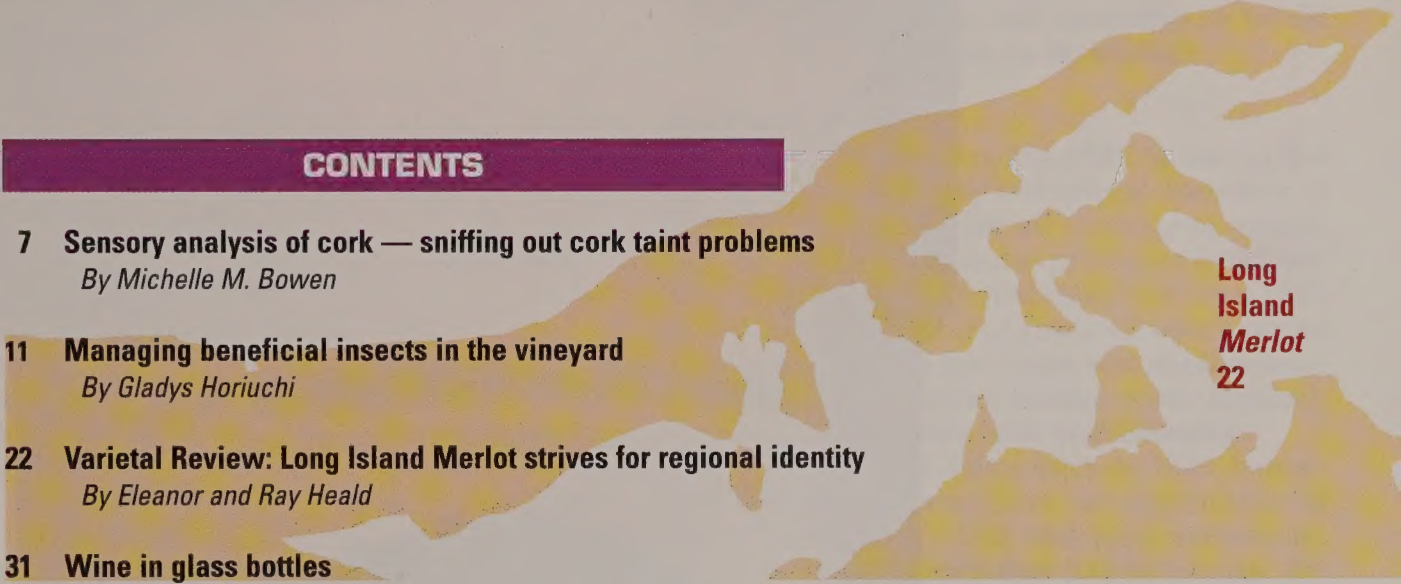

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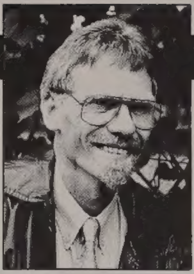

by Dr. Richard Smart

Tribute to Nelson Shaulis and his GDC

The fourth International Cool Climate Symposium in upstate New York will take place in July when many of you will be reading this edition of ***PWV***. New York is the home of Professor Nelson Shaulis, and so this seems a very fitting time to offer a tribute to him and his work.

Nelson Shaulis was a professor at Cornell University from March 1944 to his retirement in December 1978. He was the inventor of the Geneva Double Curtain (GDC). Cornell is not a well-known university for viticulture and wine studies, and so a limited number of students studied there. I was very lucky to be one of Shaulis' few graduate students.

First meeting

My first meeting with Professor Shaulis was at the CSIRO Merbein Laboratory in Australia in 1967 when he was on sabbatical. At that time I was very involved with a computer model of sunlight interception by vineyards and suffered a typical young person's delusion about the significance of his work. Shaulis soon set me straight. While he conceded that canopy surface orientation was of some significance, he said what went on within the canopy was of much greater viticultural significance. I have spent the next 30 years or so realizing just how correct this statement was.

In 1971, I went to Cornell to study for a PhD with Shaulis and began a period of intensive viticultural education which was to shape the rest of my career.

The Shaulis influence

Many people have been influenced by Nelson Shaulis. In the period 1971 to 1975 when I was in New York, there were many visitors to the Geneva Experiment Station where he worked. Among these were three of today's most influential viticulturists: Professor Alain Carbonneau of France, Professor Cesare Intrieri of Italy, and Professor Mark Kliewer of California. All came to learn from Shaulis and to observe his vines at first hand.

Carbonneau subsequently developed the lyre system and did classical studies about the role of canopy microclimate on wine quality in Bordeaux. Intrieri encouraged the establishment of thousands of hectares of GDC in northern Italy and has helped develop new machines for winter and summer pruning and harvesting. Kliewer brought the ideas of canopy management to California and, through his research and teaching influence at UC Davis, has encouraged the application of many new ideas about vineyard trellising.

Richard Smart (left) and Nelson Shaulis

Nelson Shaulis and his wife Lillian always welcomed visitors, as did other staff at the Geneva Experiment Station. Shaulis is a very intense man and very committed to his work. Many are the discussions I had with him about grapevines, often at a meal table, and invariably he would make his point by sketching graphs on his napkin!

Concept of divided canopies

Shaulis' 1966 paper introducing the GDC is one of the most significant in contemporary viticultural literature. It should be compulsory reading for all students of viticulture. The paper traces the ideas and experiments which led him to develop the GDC in the period from 1958 until 1965. The scientist was always mindful of guidance which can be picked up from studies with other crops and in other locations, so his GDC paper quotes studies from Holland, Switzerland, Australia, USA, England, and Germany.

Previous New York studies dating back to 1948 demonstrated to Shaulis and his coworkers the significance of canopy shading in reducing yield and fruit maturation. They knew that to increase yields they had to increase the number of fruiting shoots per acre. However, they also understood that increasing shoot density would, in turn, lead to increased shading with subsequent reductions in bud fruitfulness and fruit maturity. Out of this seeming paradoxical situation the GDC was developed.

A study of fruitfulness and fruit maturity in 1952 showed that the shading problem was not affected by row spacing and that the problem was thus in the vine row. The GDC was created to produce two feet of curtains (canopy) per foot of row and thereby avoid within-row shading.

Background studies detailed

It was very apparent to Shaulis that fruit on shoots exposed to the sun was more mature than that on interior shoots. In addition, exterior shoots showed better wood ripening (periderm formation) in autumn. Thus the proportions of exterior and interior shoots within a canopy seemed important in affecting maturity.

In a clever experiment, Shaulis placed potted vines in different parts of mature vineyard canopies. Their growth was dependent on local light conditions. The growth of potted vines exposed to full sunlight was 400% greater than that of vines within the canopy shade. This clearly demonstrates how much shade within the canopy reduces photosynthesis.

Another experiment compared different row and vine spacings. This study showed that vine spacing had a major effect on yield per vine, and row spacing has the major effect on yield per acre. The highest yield of mature grapes was with

Continued on page 77

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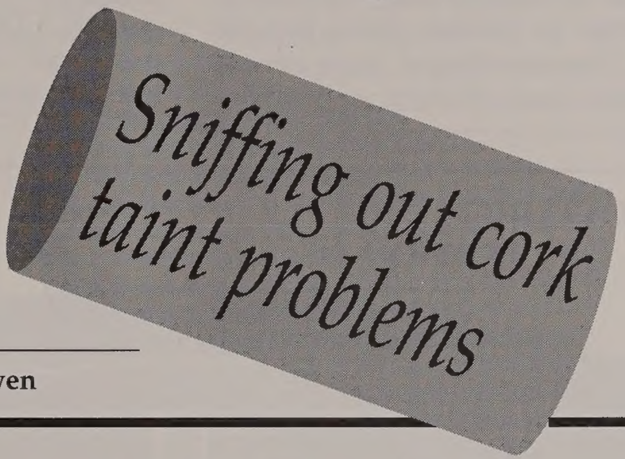
Sensory analysis of cork



Sniffing out cork taint problems

by Michelle M. Bowen

Introduction

It is a travesty to be told that a bottle of your delicate Sauvignon Blanc has been returned by a consumer due to "some sort of 'fungal must.'" After all, as the winemaker, you have not only poured your heart into the fashioning of the wine but have also utilized every talent available to ensure its integrity.

Despite the high level of vigilance you have maintained, a taint problem has occurred because of an unusual combination of circumstances or via indirect pathways not detected during your routine inspections.

With increased consumer awareness of quality, the acceptability of wines with cork-derived contaminants has declined. You therefore have the added responsibility to protect your winery's market niche, which is difficult when the wine is marred by an external source of contamination. Consumers, regardless of their level of knowledge about the causes of taint, will hesitate to buy the wine again.

Corks have persistently been implicated as a source of obnoxious odors, tastes, and mouthfeel in bottled wines, although until recently there has been little direct evidence. The circumstantial evidence is that the taint appears only in some of the bottles of wine after corking, and that taint can be detected on the cork when it is extracted from the bottle.[1]

Cork taint background

Highly sensitive analytical techniques have made it possible for the presence of small amounts of odorous compounds in corks and wines to be linked to the appearance of "cork taint." A correlation does exist between the perceived taint in the wine and the concentration of various taint-producing components, including but not limited to the chloroanisoles, guaiacol, 2-methylisoborneol, geosmin, and 1-octen-3-one/1-octen-3-ol.

TCA (2,4,6-trichloroanisole) imparts a musty, moldy, dank cellar aroma, with a flavor threshold of 1.4ng/L. One of the classic mechanisms of TCA formation is through microbial methylation of chlorophenols formed due to the hypochlorite treatment of the cork during manufacture.

Geosmin and 2-methylisoborneol are also metabolites of various bacteria, such as *Actinomycetes* spp. (from soil), *Cyanobacteria* spp., and *Streptomyces* (growing on lignin). These two compounds contribute an earthy, musty, muddy aroma at low concentrations of 30ng/L and 20μg/L. Geosmin is difficult to detect in wine, due to its variable nature in an acidic medium.[7] Mushroom and metallic aromas are linked to the presence of 1-octen-3-one/1-octen-3-ol at concentrations of 20ng/L and 20μg/L. Guaiacol, formed from wood components, has been detected at 20μg/L and is generally described as having a medicinal, smoky aroma.

Taints are perceived as contaminants when they are present at a concentration above their sensory threshold. In some cases, the term "cork taint" is erroneously used to describe the loss of fruit and addition of a "flat" flavor. In addition, a recent study has shown that the combination of acetaldehyde and hydrogen sulfide in wine under acidic conditions can form a compound indistinguishable from a common cork spoilage character by sensory analysis.[6] Because winemakers have a personal relationship with every wine they make, they are able to discern nuance changes not always perceived by the consumer. Though the consumer is more likely to observe only the true taint compounds, it is still important to detect possible problems.

Contamination of the cork is usually related to the cork batch, suggesting an intermittent specific cause, such as *in situ* microbial activity or permeation from an external source. Molecules of the contaminant may easily infiltrate the cell structure of the cork and become trapped in the cell walls, only to be released into the wine later, during insertion into the bottleneck. For this reason, both cork producers and wineries have begun critical scrutiny of raw materials, facilities, ingredients, contact materials, packaging, transport, and storage conditions.

Sensory assessment

One of the most challenging issues facing the winemaker today is establishing acceptable limits for sensory effects associated with these closures. The true incidence of "cork taint" is unknown, as is the value of assessing corks before use in an attempt to exclude those that are tainted. The screening of corks has not completely been effective, so sampling techniques and survey methods have been developed to help correlate analysis of the raw product to commercially-packaged wine.

The MIL-STD-105 (mil-spec) sampling plan outlines inspection levels, inspection severity, and accept/reject criteria.[2] Depending on your winery resources, and keeping in mind that sensory testing is destructive, you *can* develop a plan that will help reduce the incidence of cork taint.

In designing a sensory screening to test corks at your winery, you should consider testing of corks for pre-approval of lots. In doing so, consider the following:

1) Analyze a sample large enough to be representative of the entire batch. Many suppliers and customers use a sample size that does not provide statistically significant results. The test becomes pointless when, in order to reduce the amount of work involved in assessing large numbers of corks, the analyst sets up an extract of eight to ten corks. If a taint is detected in the extract, it is impossible to determine the number of corks that have contributed to it. In addition, increasing the number of corks in the extract medium has a substantial effect on the amount of material which is extracted into the wine, affecting the perception of flavor and aroma.

Sensory analysis should utilize at least 100 corks per lot. The corks should be set up individually in order to determine the incidence of taint contamination. The goal is to form a better "lot to bottle" correlation, which is not possible when using multiple cork extracts.

A complete statistical analysis of sampling procedures is beyond the scope of this article. Ultimately, sensory analysis of corks presents a classic statistical problem: in order to be 100% sure that a sample is representative of a population, you must sample the entire population. Obviously, this is out of the question.

The sampling procedure below has been found to give good results for our company and its clients. It helps limit sampling error and provides as accurate a picture as possible within certain limits of time and budget. Currently used by Juvenal Direct, the procedure was developed with information and assistance from the wine and cork industries in both Germany and Australia.

The initial sampling of the entire lot is based on mil-spec standards. Of that initial sampling, 100 corks are given a sensory analysis. Based on results of this initial analysis, a second and more intense analysis is performed, which gives a two-tier sampling process. If the initial sampling and sensory analysis detects "corkiness" characteristics over 2%, then every individual bale is sampled per mil-spec standards and analyzed. During this sec-

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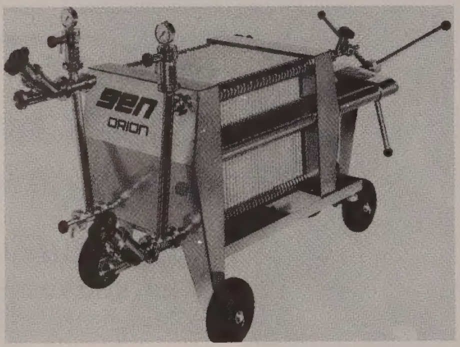

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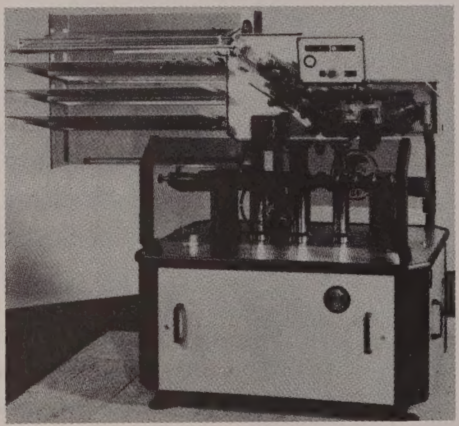

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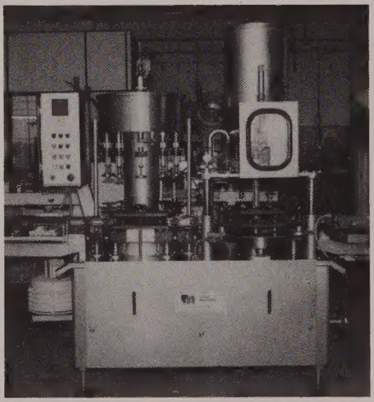

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ond sensory analysis, any lots with "corkiness" characteristics are rejected.

2) The extraction medium is crucial. If wine is used, it must be neutral; any aromatic compounds, SO_2, or heavily oaked aromas may interfere with the perception of taint. The use of water as an extraction medium is recommended. Taint compounds migrate freely into water, and are much easier to detect, such as in the previously mentioned case of geosmin.

The odor threshold of TCA in beverages varies inversely with the alcohol content. As alcohol concentration increases, the vapor pressure of TCA is reduced, and with more intensely flavored beverages, its musty taint is more likely to be masked. Sensory work done in Germany,[3] and by the Australian Wine Research Institute has shown that the odor threshold for TCA in water is 0.03ng/L, as opposed to 10.0ng/L in wine.[5]

3) Contact time during extraction is important. The perception of "sound" cork characters, which are generally described as "sweet, oaky wood," increases with contact time and obscures true "taints." Normally, it is difficult to define the intensity of such characters. It is only if these aromas are very intense that they should be considered objectionable.

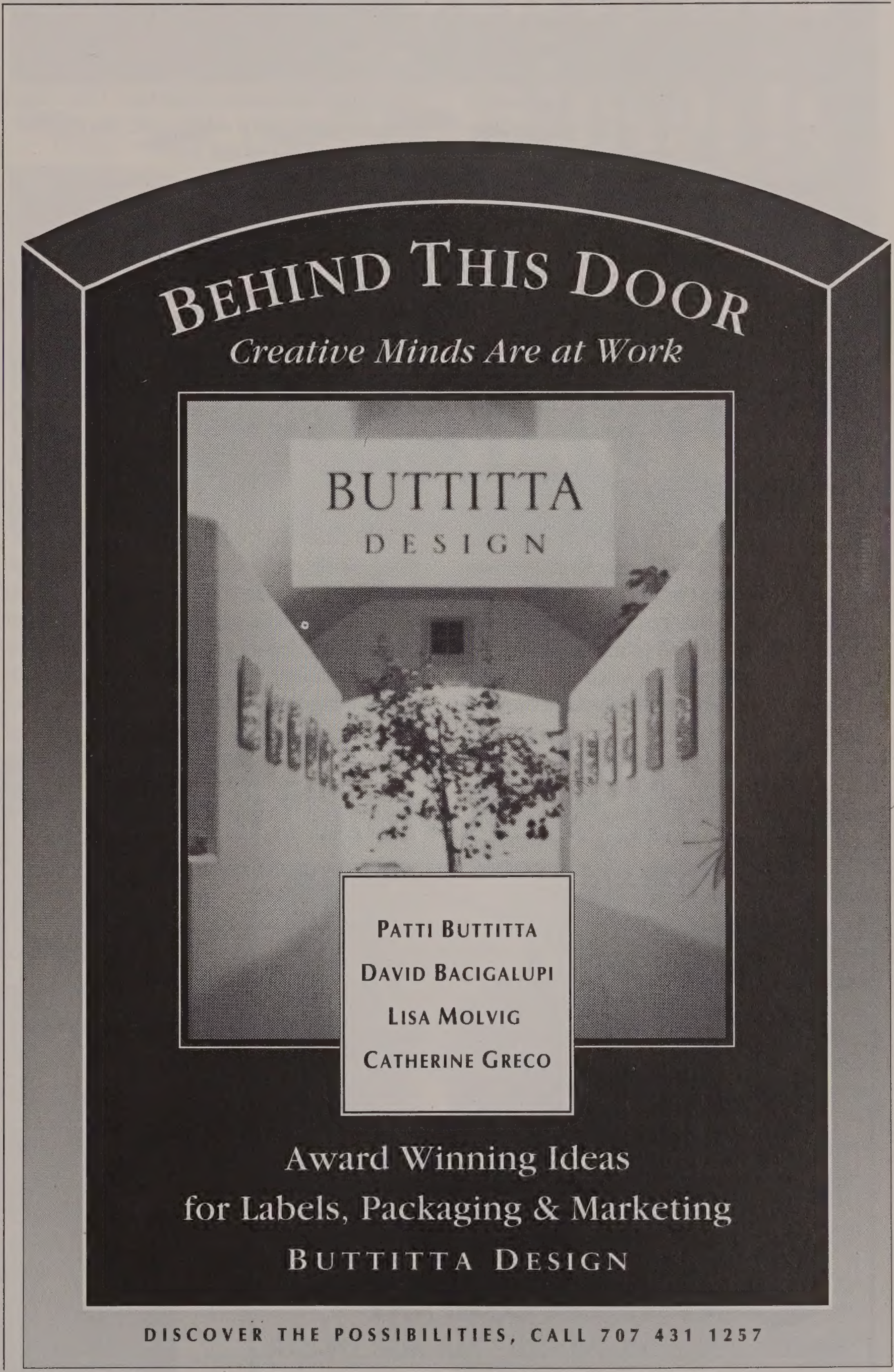
Trials have indicated that TCA is extracted quite quickly into the medium. However, aromas caused by the presence of other cork-taint compounds can be fleeting. It is therefore suggested that 30 hours at ambient temperature in a controlled environment is optimal for extraction.

4) Some distinction must be made between the normal natural woody characters and the presence of true "cork taint" compounds. Corks provide an enormous surface area for extraction of aromatic compounds. Corkwood is not inert, and it should be accepted that there may be some sensory effect associated with these closures. Often characters such as pine, eucalyptus, and resin are apparent, which in excessive amounts, can themselves be classified as objectionable.

5) Sensory variations caused by different washes will occur in uncoated corks. For instance, chlorine-washed corks occasionally exhibit aromas unlike natural sweet oak. Rather, they may be more like "chemical," "ethanol," and "slightly earthy." In hydrogen peroxide-washed corks, aromas such as "oxidized" or "developed" may occur.

One must be careful while testing agglomerate corks, as aromas such as "plastic," "petrol," and "adhesive" are manifest. These nuances can affect the relationship between "taint" observed during testing and that in a bottled product after a period of storage. However, these characteristics are masked once the corks are coated.

6) The number of analysts is important in all sensory evaluations. A panel of analysts should be large enough to account for variation in opinion. When assessing large numbers of samples, a loss of sensitivity may also occur, causing disparity in the results. Accordingly, sensitivity trials should be set up to determine who should be included in the analysis. Panel members should



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undergo formal training for determining individual taint recognition thresholds.

Procedure

Keeping these guidelines in mind, a procedure may be designed that will help to insure product integrity and quality. Excellent results for both uncoated and coated corks have been obtained with the following:

For each lot of corks to be tested, prepare 100 (200ml capacity) sensory-neutral jars with Teflon-lined caps. Place 100ml of freshly deionized water into each jar. Add one cork to the jar, replace the cap, and screw it on tightly.

Gently swirl the jar to wet the entire cork. Include two reference samples, one with fresh deionized water and the other with a solution of 1.5 ng/L TCA in deionized water. Allow the jars to stand at room temperature for 30 hours in order to achieve complete extraction. After 30 hours, perform sensory analysis. Gently shake the jar, open the lid and quickly sniff the headspace.

Cork taint rejection criteria

Cork taint assessment is an acquired skill. Those who are unfamiliar with the test usually reject corks due to characteristics that may not be found in packaged wine. It is essential that panelists be able to recognize TCA and other types of taint which are responsible for consumer rejection. Acceptance or rejection may be based upon the following categories:

Class I: (Acceptable) Good, sweet, oaky cork wood.

Class II: (Acceptable) Samples with slight earthy, mushroomy tones which are not considered "taint." Samples with such characteristics as waxy, dusty, green wood, plasticine, pyrethrin, solvent, glue, or chemical may be placed into this category as long as the aroma is not overwhelming. These characters are most often associated with untreated cork and are masked by the application of surface treatment materials. This class is included to help determine the overall sensory profile of the lot.

Class III: (Unacceptable) Samples with obvious taint compounds such as geosmin, TCA and other chloroanisole or chlorophenol taints are rejected.

In a perfect world, all corks would be Class I. However, TCA may be found in approximately 2% to 8% of all corks. It is generally accepted that over 2% of Class III corks in a lot should require first, resampling, and then rejection if the results are duplicated.

Conclusion

This method guarantees a good sampling of the cork lot and offers a monetary savings. It is meant to give the analyst and winemaker a genuine understanding of the lot's sensory profile. As such, the test is a valuable assessment tool prior to purchasing packaging materials.

The test may also be used on finished product. The use of unsound coating products and possible storage or microbiological problems may be indicated during the extraction process.

Whenever possible, the results from sensory assessments should be correlated to the analysis of tainted wines from in-house tastings, and stock returned from consumers. With proper sampling, evaluation, and monitoring procedures in place, it is possible to reduce the incidence of cork taint. ■

Michelle Bowen is quality assurance director, Juvenal Direct, Inc., Napa, CA.

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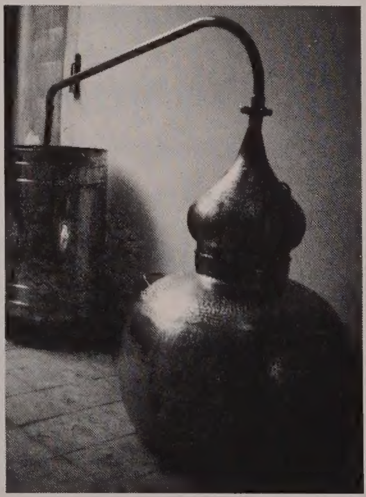
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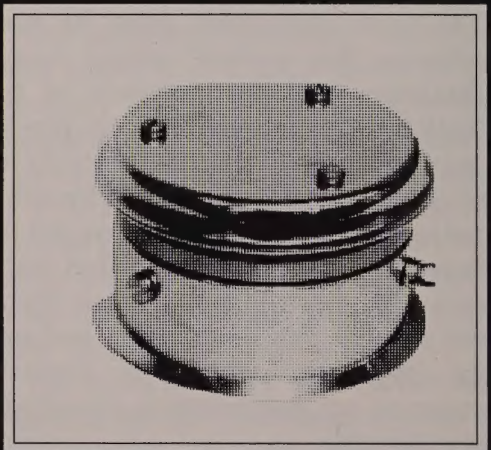
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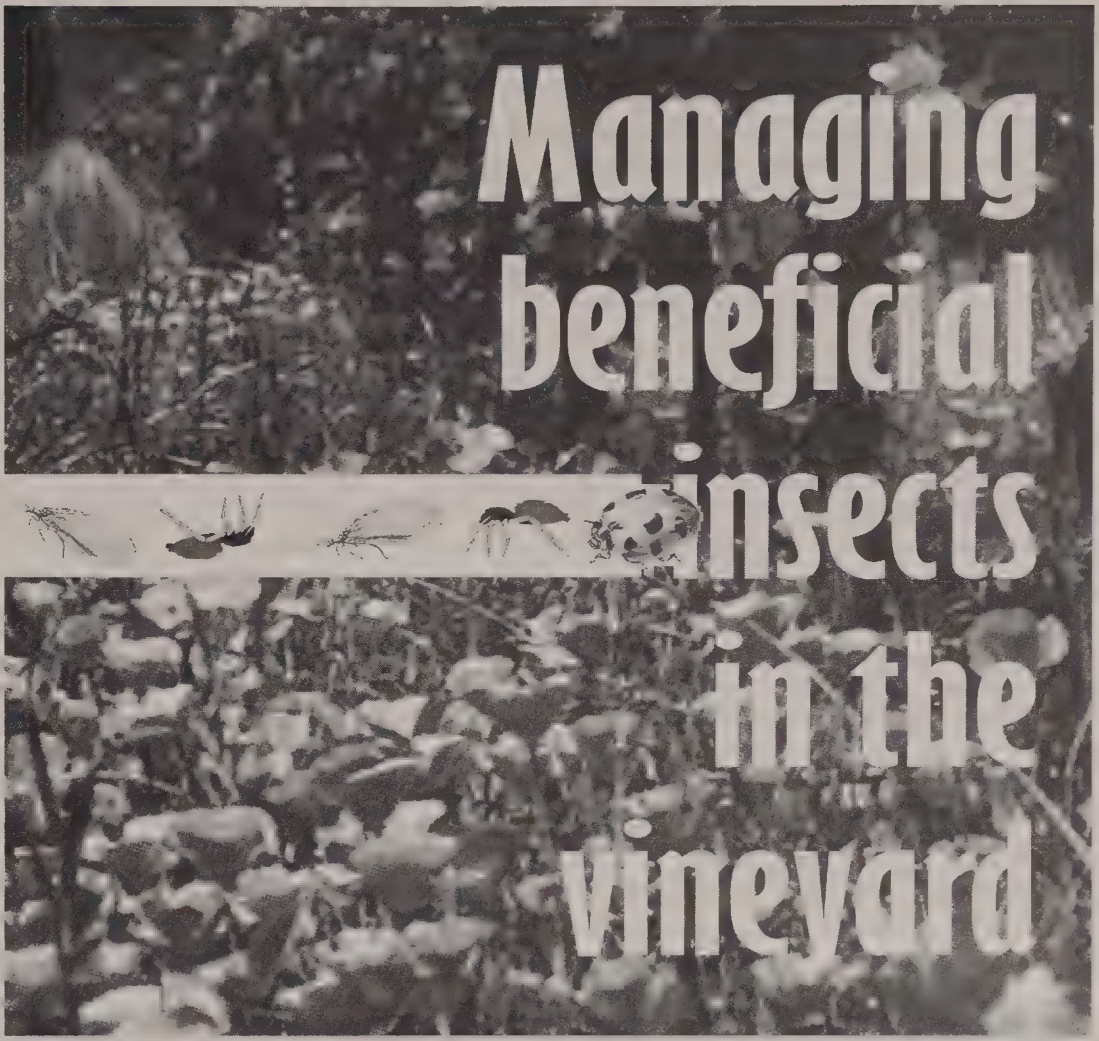


by Gladys Horiuchi

Integrated pest management (IPM). Sustainable farming. Organic grapegrowing. Modern grape growers are investigating many pest control approaches, ranging from limited use of synthetic pesticides to almost none at all.

Though these schools of thought represent different philosophies on pesticide use, the goal is the same — to achieve maximum reduction of insect pests with minimal impact on the environment, worker safety, and growers' pocketbooks. For several California vineyard managers, this means increasing use of predatory and parasitic insects and learning by trial and error how to best apply these beneficial creatures in varying vineyard circumstances.

Clos du Bois

Viticulturist Steve Thomas uses an IPM approach on Clos du Bois' 600 acres in Alexander Valley. "It's expensive and counter productive to apply chemicals using a calendar approach," he says. The winery's intense monitoring program allows for the application of less toxic or soft pesticides only as necessary, and chemicals are rotated to minimize pest resistance.

At bud break, Thomas looks for damage from cutworms (e.g. *Amathes c-nigrum*), thrips, and earwigs. If the block's vigor is strong, the vines usually grow out of the damage, and pests often disappear in a month, he observes. If pest numbers are high and their presence prolonged, Thomas will spray with an organic pyrellin for thrips and will hand-apply Sevin Bait to the vines for chewing insects.

In April, as shoots expand, more prevalent pests are monitored: western grape leafhoppers, Pacific spider mites, and Willamette spider mites. Every week, Thomas inspects at least 10 leaves in a five- to 10-acre block. If he begins to detect increasing numbers of these pests, he increases the sample size and inspects these problem areas more often.

As the growing season develops, an average of more than 20 first brood leafhopper nymphs per leaf is a signal to consider a treatment with a pyrellin and soap spray. In most years, leaf removal for better light exposure in the fruit zone has the added benefit of the removal of the first brood nymphs on the basal four leaves. Many sprays for leafhoppers have been avoided by this judicious timing of leaf removal before the nymphs become adults and lay eggs for the next generation of leafhoppers.

With spider mites, Thomas looks for light, moderate, or heavy infestation and also considers canopy vigor. For mites, he will try to let the predacious insects reduce mite numbers, but if mites continue to increase, a treatment will be considered.

Experience has led Thomas to adjust his methods of attack on mites. He likes to treat early in the season with a soap or oil spray because control was 50% at best. These sprays are usually applied in May and are an initial attempt to lower mite populations and hopefully give predators enough time to do their work.

Predatory mites were released in two consecutive years to control increasing pest mite populations; but the reduction of pest mite populations was not successful. The recommended release of 3,000 mites per acre was done in 1993 and 1994. These single releases on an expanding pest mite population may also have been effected by a heavy reliance on sulfur for mildew protection. In the future, Thomas may try an earlier release of predators followed with something less disruptive than sulfur for mildew control.

Where predaceous insects and soap sprays have not been able to control expanding pest mite populations, Vendex has been applied as a last resort. (Vendex is a conventional pesticide that is easy on beneficial mites and honey bees.) The cost of a predaceous insect release can be the same as a chemical spray, but as Thomas says, "In the wrong vineyard block, an expanding pest mite population needs to be controlled or we can have some delayed ripening and sunburn at harvest."

Despite this lack of success with beneficial mites release, Thomas is convinced that chemicals do not provide a complete answer for pest control. "Because pests form a resistance to chemicals over time, we may not get the same control after using the same materials year after year. Most pest problems are localized and healthier vines can tolerate more pests without expressing damage, so we are moving toward sustainable farming practices like cover crops and compost to enhance beneficial insect habitat and increase soil health and fertility. Our success in reducing chemical sprays in the last few years can be attributed to creating a more diversified environment with a wider variety of plants and insects interacting with each other."

Essentially the goal at Clos du Bois is to identify the least disruptive farming practices and minimize pest outbreaks and the need for pest treatments. The basis for their sustainable farming practices is the matching of a variety of cover crop mixes to a range of vineyard conditions which include vigor, rootstock, and wine quality considerations.

Although the cover crop mix changes over time, the current combination includes purple vetch, Australian winter peas, barley, oats, and bell beans. This mix has a staggered bloom which attracts a variety of general feeders — lacewings, lady beetles, many species of spiders, (mostly *Thomisidae* and *Araneidae*), and minute pirate bugs (*Orius*), which are predators of leafhoppers and mites.

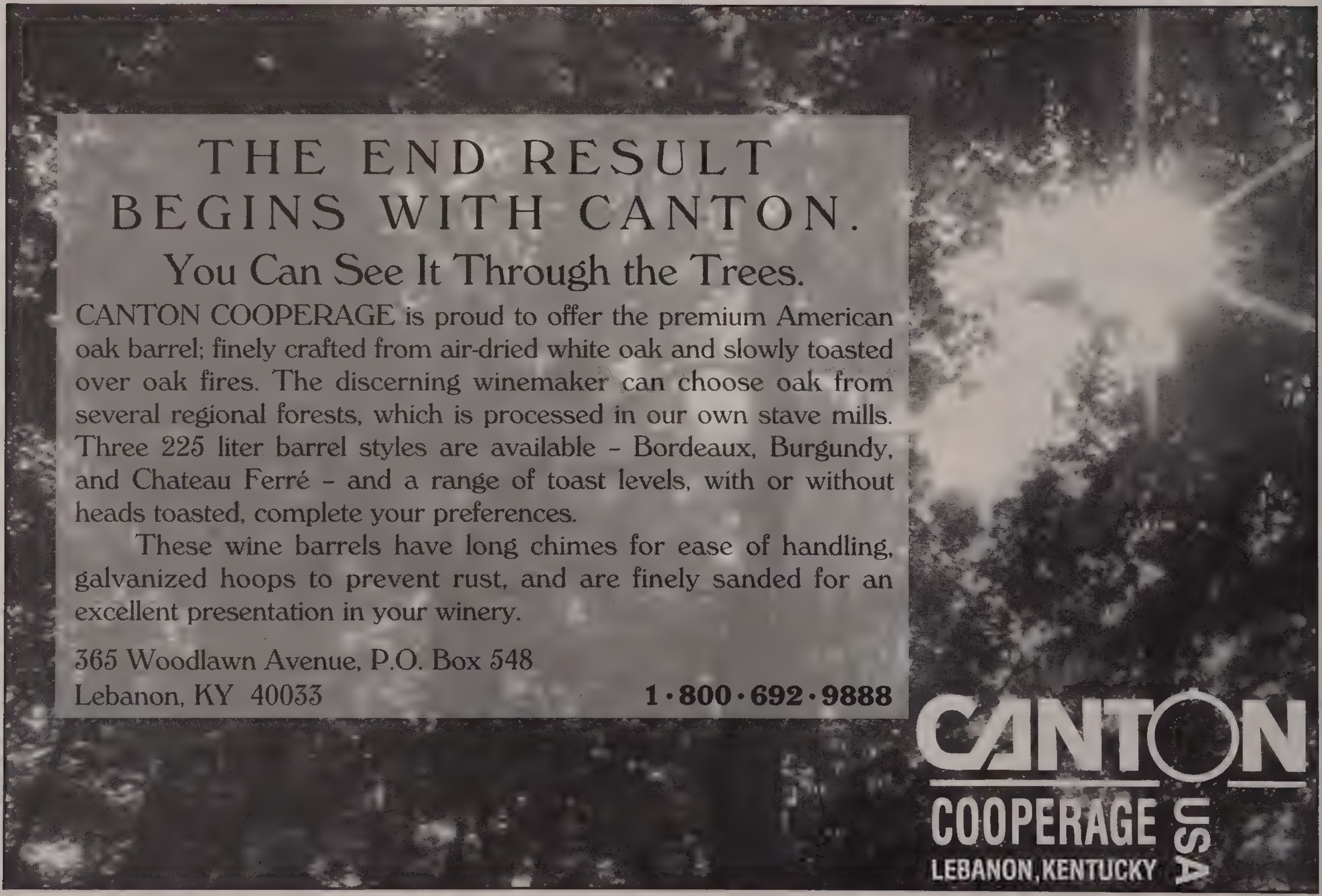
Cover crops are grown between the vine rows. A six-foot-wide strip is planted in the middle of a 12-foot row space so cover crops won't grow into the vine row. A grass-dominated cover crop is only used to "put the brake on vine growth in vigorous vineyards." Competitive grasses slow the vines' vegetative growth and improve grape and wine quality.

"One of our vigorous Chardonnay vineyards had a nitrate level of 3,000 ppm in the vine tissues at bloom," he recalls. "Planting the grass cover crop resulted in a reduction to 1,000 ppm which is more balanced, and in the process we reduced bunch rot problems, as well."

For vineyards of average vigor, Thomas has established an alternating middle system to provide year-round insect habitat while adding to soil organic matter. In the fall, cover crops are planted in alternate rows which get mowed for one year and disked the following spring. Alternate rows are planted the next fall, and the cycle is repeated.

In low vigor and hillside vineyards, a no-till cover crop mix includes self-reseeding annuals: crimson clover, rose clover, Zorro fescue, and sub clovers with a staggered bloom cycle to attract predators and parasites longer. "This mix has a low-profile that minimizes mowing and becomes dormant by May, in most years, so it requires less maintenance and is less competitive with water-stressed vines."

Another attempt to diversify the vineyard habitat has been to establish border areas with plants known to harbor beneficial insects. Rows of French Prune trees have been planted along vineyard rows as well as buckwheat and deer grass. These plants in the riparian borders again add more plants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and insects to the vineyard environment, and will hopefully reduce the need for disruptive chemical sprays.

Fetzer Vineyards

Farmed organically since 1986 in Mendocino County, Fetzer's 360 acres have arthropod pests (insects and their relatives) that include Pacific spider mite (*Tetranychus pacificus* McGregor), Willamette spider mite (*Eotetranychus willamettei* Ewing), western grape leafhopper (*Erythroneura elegantula* Osborn), and several species of thrips.

Vineyard manager Tom Piper says Fetzer's insect control program combines three elements: cover crops; reduction of dust and stress on the vines; and sulfur application for mildew control and suppression of mites.

Finding a suitable cover crop mix to provide a beneficial insect habitat has taken years of experimentation at Fetzer. The original mix was oats, peas, and vetch, according to Piper, but these were not ideal. Vetch flowers attracted beneficial bugs, but the plant became uncontrollable in the wetter spring years.

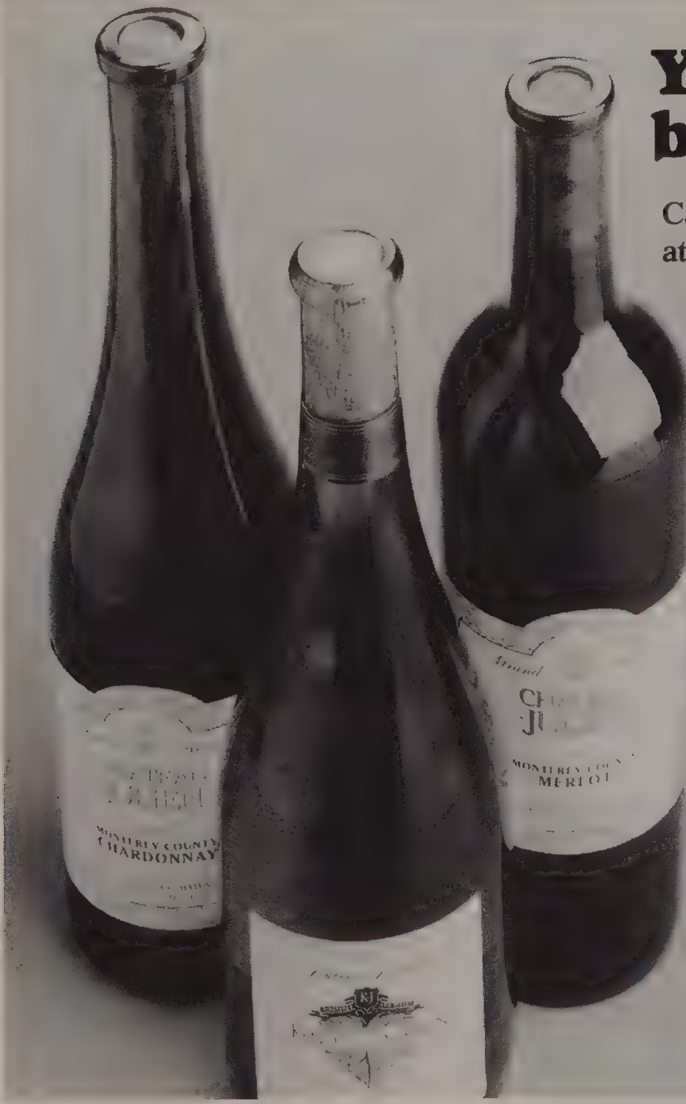
The crew had to manually remove vetch from the vines. Pea flowers attract lacewings (*Chrysopa* spp.) and lady beetles (e.g. *Hippodamia convergens*), two beneficial insects that help control insect pests, but bloom in April/May (later than desirable). Piper notes that although insects are attracted to flower nectar, "We haven't been able to get a correlation between flowers and insect control." Other experimental cover crop combinations of Medics — legumes related to burr clover and alfalfa correlated with higher thrip counts.

For Fetzer, subclovers have proven successful as a permanent cover crop. He believes that subclovers provide a "soft plant" which sucking insects, such as thrips and mites, may prefer to grapevines.

Subclovers also offer several other advantages. They reseed themselves and require mowing only two or three times each year. The mat also reduces dust, particularly in July through mid-August when the vines are dry, stressed, and susceptible to mites. In dormancy, Fetzer's subclovers "are crawling with spiders," observes Piper.

Alternate middles are planted with soil-building crops: oats, peas, and bell beans. These are rotated with other fertility crops such as crimson clover by itself — which has little insect use, but comes up early and builds the soil with nitrogen and organic matter — is alternated with radish and Cahaba white vetch. This vetch doesn't get unruly or reseed very vigorously. Both radish and Cahaba white vetch have good flowers that attract beneficial insects.

Fetzer has never used augmentative release of beneficial insects because the cost is high and there is no easy way to monitor results. They have encouraged existing beneficial insects by maintaining the native plant community near the vineyard. "Native grasses are



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among the best predator insect habitat," asserts Piper. This vegetation is encouraged by mowing two to three times a year (once in spring and once in summer), and by refraining from cultivating or disking these areas.

Jekel Vineyards

Jekel Vineyards in Monterey County practices sustainable viticulture and is moving toward organic certification. Having 318 vineyard acres located in widely differing microclimates near the Arroyo Seco River challenges general manager Rick Boyer and vineyard manager Joe Pedraza with a variety of insects specific to each vineyard.

Western Flower Thrips and Willamette spider mites thrive in the cold Gravelstone vineyard, while western grape leafhoppers inhabit the warmer Sanctuary vineyard.

Jekel's IPM approach is based upon balance, through the use of cover crops, compost, early reduction of pest numbers, and heavy monitoring. The cover crop program consists of reseeding clovers in alternating row-middles. Depending upon the soil type, these covers consist of a mixture of burr and barrel medics, sub clovers, rose, and crimson clover or of rose and crimson by themselves or of a heavy California poppies insect mix.

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The medic-clover and clover mixes get good early growth which keeps the thrips off the vines and attracts many predatory spiders and lace wings. These are both very good all-purpose feeders. The poppy mix attracts thrips to the petals which in turn act as a feeding area for minute pirate bugs and big eyed bugs — both are great thrip predators.

Alternate row middles are planted with either Austrian winter, magnus, miranda peas, and oats or Daikon radish and bell beans in the winter/spring and Chinese red cow peas in the summer for bio-mass production.

Boyer has had very good success in controlling Willamette mites with releases of the Persimilus species of predatory spider mite. This species is usually released in strawberry fields and is almost twice as voracious as the Occidentalis species. Releases were early and heavy. Release occurred when the Willamette mite counts were 10 to 12 mites per leaf, and release volumes were 8,000 to 9,000 per acre equivalent. After two years of releases, the vineyard did not require predator releases in 1996.

The south side of Jekel's Sanctuary vineyard abuts native grass-covered hillsides, which have significant numbers of overwintering adult leafhoppers. These are controlled with use of Hopperstopper sticky tape.

"We try to get the tape out two weeks before bud break (the color of the tape is yellow, but the insects view it as green leaf surface)," says Boyer. "Then we use our sulfur duster to blow air into the native grass to make the adults fly. They see the perceived green surface in the vineyard and fly to it. This results in a much smaller first generation of nymphs that are then handled with the normal leaf pulling pass through the vineyard."

Boyer pronounces this IPM program very successful for Jekel. The vineyards no longer experience pest damage heavy enough to have an economic impact.

LangeTwins, Inc.

"The key to our insect management is better monitoring of pest populations, cover crops, and weeds," says Randy Lange. He and his brother, Brad, grow winegrapes in the Lodi-Woodbridge district of California. LangeTwins combines visual inspection and technical analysis as the basis of its IPM program. "Monitoring must be done to achieve vineyard balance with cover crops, soft sprays, irrigation practices, and the perimeter habitat."

Field personnel at LangeTwins are trained to look for potential problems in the vineyard and report them. They're looking for insect damage and signs that vines are water-stressed, such as poorly growing, yellow, or brown shoot tips. Lange says they count both beneficial and damaging insects through out the growing season to establish threshold counts and to monitor for problematic infestations.

As a supplement to visual inspection for water stress, LangeTwins uses neutron probes to help determine water usage and available water. Routine petiole analysis (at 50% bloom) and soil samples aid in determining nutritional needs and the presence of soil-borne pests. Healthy vines, adequately nourished and appropriately watered, are a critical factor in pest management, because they are less affected by insect damage.

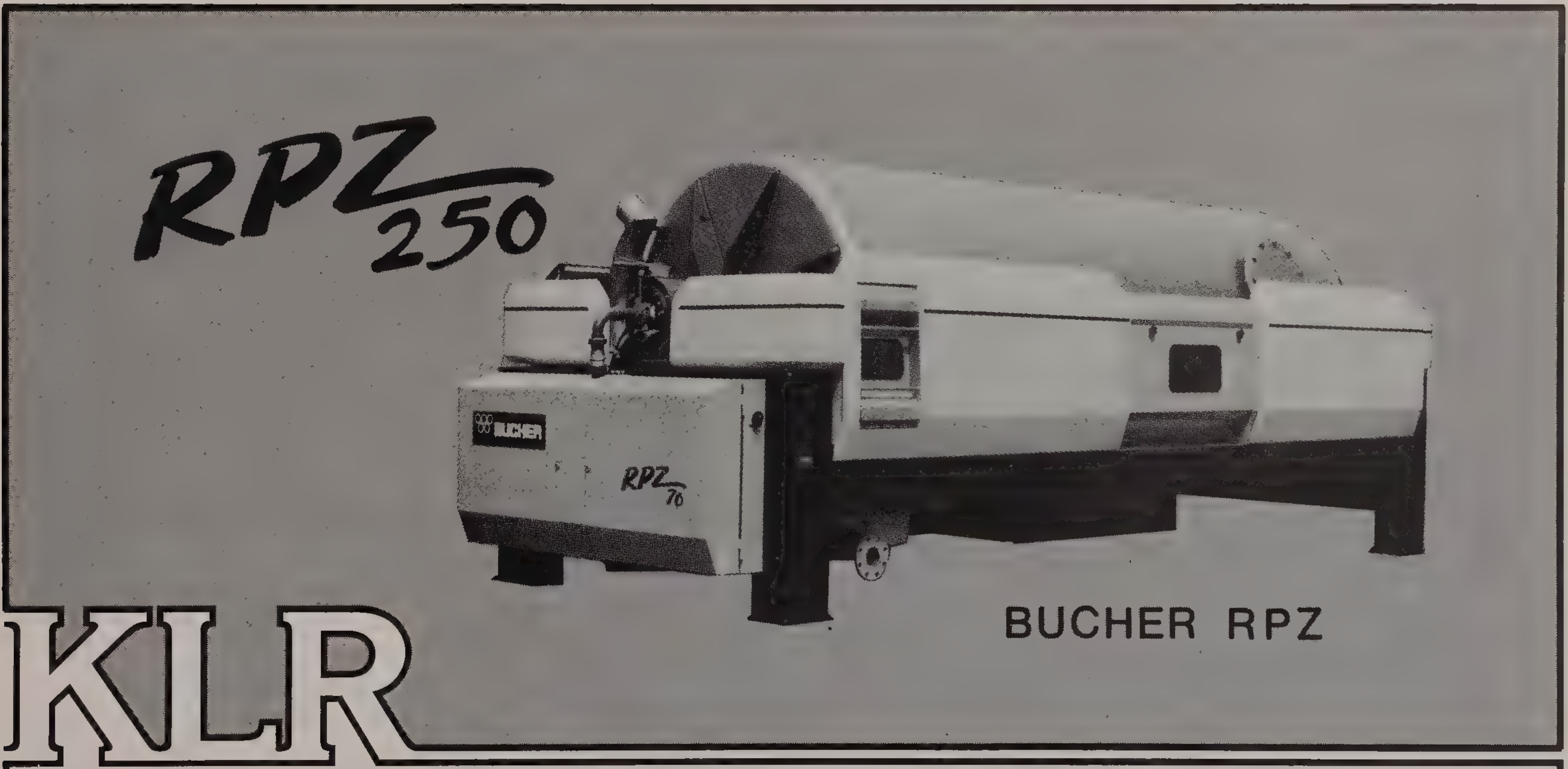
Canopy management plays an important role in the LangeTwins IPM program. New plantings have a vertical trellis to open the canopy and improve fruit maturity and bud fruitfulness. This also brings more light deeper into the canopy, which potentially decreases the hopper population since hoppers prefer a cool and shady environment.

"Nearly every aspect of vineyard management has at least one component that affects pest control," says Lange, "from cover crops to irrigation to the equipment used in the vineyard."

The most successful cover crop at LangeTwins is a California native grass mix of 40% Idaho fescue, 40% Molate fescue, and 20% pine blue grass. The brothers believe subclovers are too competitive with the vines to include in the mix. The cover crop is mowed twice each year; first for frost control and again, usually in May, when the head seed has developed.

"Cover crops reduce compaction, improve water penetration, allow year-round entry into the vineyard, reduce dust (which helps control mite populations), and may provide habitat for beneficial insects," says Lange.

LangeTwins doesn't use pre-emergent herbicides, choosing instead to use contact-only sprays to remove weeds. Soil health is improved by using compost to increase micronutrients and microbial activity for healthier, more competitive vines. The vineyards' drip



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and sprinkler irrigation systems contribute with precise fertigation and spot application of fertilizer.

Pests and diseases are controlled through leaf pulling and shoot thinning and by providing habitat to encourage predators, such as owls, bats, and raptors.

The growers spray only as a last resort. When pest infestations make it necessary, they use alternative soft chemicals, such as pyrellin, M-Pede, soaps, and Omite (at reduced rates). In 1995, for example, they made one application of pyrenone in early June (after bloom, before bunch closure, and after leaf pulling) to knock down the leafhopper population. Also, for the first time in late July 1995 after veraison, they applied nicotine-based Provado in leafhopper hot spots as a "safety net."

For both applications, they used a newly purchased electrostatic sprayer, which Lange reports, gave them improved penetration and coverage at much higher ground speeds with much reduced water use (10-gal per acre). In addition, they believe the sprayer reduces actual chemical usage and improves worker safety because the amount of chemical mixing is reduced.

LangeTwins' IPM program takes advantage of new technology in other areas as well. Rather than applying sulfur for mildew control by the calendar, the brothers use in-the-vineyard computer monitoring of conditions to determine when sulfur application is necessary.

Taken together, Lange says, these techniques allow LangeTwins to control pests and diseases economically, without resorting to heavy chemical use.

Robert Mondavi Winery/Vineyards

Robert Mondavi Vineyards uses integrated pest management techniques to control vineyard pests. Beneficial mites have been released into vineyards which have had a history of mite problems, for example, with some success. In the "Z" block, one of Mondavi's highest quality Cabernet Sauvignon blocks at the Tokalon Ranch in Oakville, CA, *Metaselulus occidentalis*, a predaceous mite, was released to help curtail spider mites.

A dust reduction policy was established that limited vehicular traffic through vineyard avenues. Speed was limited to five mph. Cultivation was reduced by limiting the number of passes with a disc to a minimum. There have been no mite problems in the "Z" block for ten years.

"It's probable that all three management strategies helped to reduce the mite problem in `Z' block," says DeWitt Garlock, winegrowing technical manager. "It's not likely that the predaceous mite release alone would have achieved the same results. We have not done many other predaceous releases."

In Mondavi's older vineyards, Garlock has seen beneficial mites build up naturally if pesticides toxic to mites

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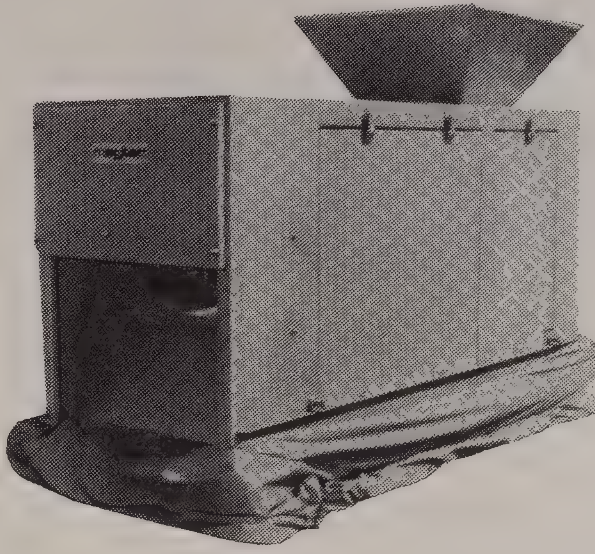
are not used, especially dimethoate. In younger vineyards, however, where predaceous mites may not have reached economic damage levels, the release of *Metaselulus* may help.

He believes a contributing factor to decreasing mite pest populations may be the proliferation of more sulfur use. "In the past where only DMI materials were used, mites tended to increase. This was the case in the Carneros area where Willamette mite, which prefers a cooler climate, has been increasing. The populations seem to have decreased over the past several years."

"Others have reported that the use of covercrops has been a beneficial tool for managing insects and other pests. We continue to use cover crops primarily for the benefits of erosion control and reduced soil compaction. We have not seen a direct benefit from an increase in predaceous insects and mite predators that we can measure. Reducing tillage does reduce dust and this is probably an indirect benefit in reducing mites on sensitive varieties, including Zinfandel, Chardonnay, and Semillon."

"We have observed that predaceous insects which reside in the cover crops tend to stay in the cover and don't move readily to the vines. However, where spider populations have built up, we have seen some effect in reducing grape leafhopper populations. We are convinced that farming smaller vines in terms of keeping annual growth in control will help in reducing leafhopper problems. Reducing vigor helps to reduce egg laying and survivability.

The effects of cover crops on predaceous insect habitat and the overall effect on leafhopper populations is being studied. Mondavi is in the second year of a trial with Dr. Rashid Hanna from U.C. Davis, to study the effects of covercropping on the dynamics of grape leafhopper population. Using vetch and oats, the trial attempts to quantify the effects on nymphal counts, look at the effects of vine water stress on the population, and see if imposing water deficits by delaying tillage will reduce the populations. (This final aspect will be accomplished by varying the timing of disking to allow more water to be drawn from the soil profile.)



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"Using a 'trade water for pesticides' approach may allow us to manage this pest more effectively. Also, the use of cover crops may help to build up spider populations," Garlock says.

When other methods do not work, then Mondavi's last resort is use of a pesticide, but all other IPM strategies have to be exhausted first. Only organic soaps, pyrellin, and oils are used. Pyrenone is also occasionally used.

"We are looking at a new material called Provado," Garlock notes. "We have not used organophosphate pesticides since the early 1980s. We sample the vineyards weekly to determine the nymphal count peak. If a spray is required, we do this at the first brood because soaps are not effective on adults which are more prevalent when the second brood has peaked. Typically, we end up treating a very minor percentage of our acreage. In 1995, this was 1%.

Mondavi has planted *Prunus sp.* trees (French Prune) to help with the buildup of the *Anagrus* wasp. "It is not clear yet whether this is going to be highly effective," Garlock explains. but whenever Anagrus is present in high enough numbers, parasitization of leafhopper eggs is very good and counts often never reach damaging levels."

When working with growers, Mondavi encourages them to use the same IPM approach. "Whenever possible, we help to educate our growers in IPM monitoring techniques. Some of our growers are using cover crops and have planted prune trees. Very few have tried beneficial releases probably because this technique has not worked as well.

"Part of the education process is to get the grower used to some damage from leafhopper feeding in the vineyard. Vines can tolerate a lot of leafhopper feeding injury without loss of maturity of the fruit or carbohydrate storage. Mites have to be watched much more closely because it is harder to monitor them and if too much damage occurs, the vines can be weakened."

Through its process of testing new strategies and evaluating current methods, Mondavi is working to develop 'natural farming' as a system approach. The goal is to ensure that whatever method is chosen and used will work without disrupting other

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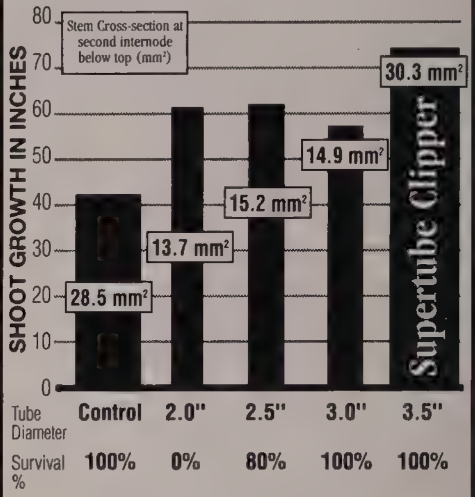

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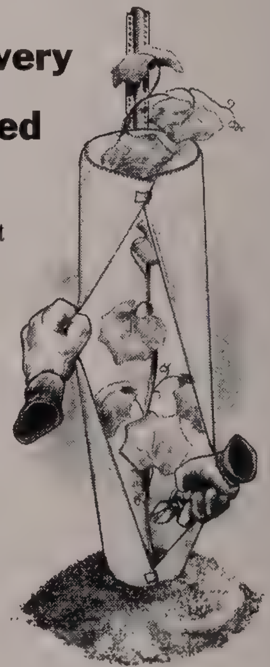

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components of the system.

"For example, we want 'off farm' inputs to the vineyard to be minimal, especially for insect control," Garlock says. "If we can avoid the use of pesticides we will do so. If this can be done by sustaining a cover crop year after year, while maintaining grape quality, then this fits our definition of 'natural farming.' We do not use cover crops on a site if other factors are upset.

"Vine water use is one of the factors we have to watch carefully for compatibility with the use of cover crops. Because we want to continually improve the system, we have an ongoing commitment to research, integrated pest management principles and practices, and a willingness to change and adapt."

Sutter Home Winery

Sutter Home Winery farms organically in 75% of its 3,000 acres located in six counties. Viticulturist Todd Berg relies on cover crops that create insect habitats and build soil health. The cover crop strategy at each ranch varies greatly and many different strategies are employed.

The most widely used strategy is planting of a cereal grain (rye, barley, or triticale) in every other middle with an alternate middle planting of a green manure legume blend that is tilled under in the spring for soil fertility. Plantings of native perennial grasses, mustard, wildflowers (for aesthetic purposes) and subterranean clovers are also used at some ranches.

At Sutter Home vineyards in Amador County, where dry-farmed vineyards have soils consisting of decomposed granite, Willamette spider mites thrive in the hot and dusty climate. The clover cover crop provides an alternate food source for predatory mites and keeps dust down by reducing the need for cultivation.

Oiling and watering the roads are part of Berg's system and so is early spraying of Safe-t-cide oil to kill mite eggs when vines have six- to 12-inches of shoot growth. A 10-mite count on a 50-cent-size leaf is the threshold for spraying.

Water sprays also efficiently reduce mite damage late in the season after sulfur is no longer needed for powdery mildew. "It's only cost-effective for a flare-up, a hot spot of small acreage,"

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explains Berg. "Water spray reduces the dust factor, minimizes plant heat stress, and has a washing effect." He waters twice weekly for two or three weeks until the problem declines, then once each week.

Predatory mite releases had limited success in Sutter Home vineyards, reports Berg. In a three-year trial in Amador, predatory mites (*Metaseiulus occidentalis*) and six-spotted thrips (*Scolothrips sexmaculatus)* were released four times each season. These beneficials had been raised on bean plants with two-spotted mites as food.

The theory was that predatory mites, accustomed to a two-spotted mite diet, would eat spider mites. The bean plants were placed onto the vines and as the plants dried up, the beneficials transferred to the vines. The experiment had a positive influence the first year, Berg reports, but no benefits the second and third years.

Berg has found it effective and economical to do one high volume release of 10,000 predatory mites per acre on small problem areas in the early summer. A bean plant is placed on every other vine on the first 10 rows along the border of heavily-traveled roads where dust levels are highest. The predatory mites then either spread with the wind or follow the food source. Berg treats 50 to 80 acres out of 1,000 at their Arbuckle ranch in the northern Sacramento Valley.

"We used vials of predatory mites one year for comparison, but decided that bean plants were a more natural system. The mites are reproducing on the bean plants, so we get the benefit of hatching eggs."

Berg also pays closer attention to varietals that attract more mite problems. He believes Zinfandel and Barbera leaves, with their hairy undersides, seem to hold more dust. Therefore there are more mites than would be found on smooth, Sangiovese leaves.

Sutter Home's strategy for controlling grape leafhoppers in organically certified vineyards has changed since the late harvest of 1995. Then, high numbers of leafhoppers were slowing grape maturity late in the year when wet weather conditions could have had a disastrous effect on yield. Nymph counts based on standard University of California guidelines of 15 to 20 nymphs per leaf did not warrant treatments early in the season, so no treatments were made. As the season went on, leafhopper numbers rose, resulting in substantial vine damage.

None of the organically accepted materials that Berg has tried have been successful in knocking down late season leafhopper problems. Berg notes, "The softer insecticides used in organic systems are not like the commercial silver bullets. The mode of action of most of the softer insecticides (soaps, oils, pyrellin) rely on coverage for control. That is a very difficult task to achieve with a large vine canopy late in the season."

Next time, Berg will treat at an earlier stage of infestation, spraying M-Pede on the first brood when better coverage can be achieved. He will also continue leaf-pulling to remove leafhopper eggs destined to hatch in June. Prune trees are continuing to be planted on the headlands and along the borders as natural habitat for Anagrus epos. wasp.

Conclusion

The experiences and approaches of these vineyard managers show that insect management cannot be successful with a cookbook approach. The method for one vineyard may be different from another depending upon variables such as climate, soil, or site. The program can change because the problems change from year to year, and even during a year. Every vineyard manager needs to assess his or her particular vineyard environment to find the most ecologically sound and cost-effective way to control each pest. ■

Additional Resources: A free copy of *Suppliers of Beneficial Organisms in North America*, publication PM94-03, is available by request from the California Environmental Protection Agency, Department of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, 1020 N Street, Room 161, Sacramento, CA 95814-5604. Tel: 916/324-4100.

"Pests of the Garden and Small Farm. A Grower's Guide to Using Less Pesticide" by Mary Louise Flint, 1990. Statewide Integrated Pest Management Project, University of California, Division of Agriculture and Natural Resources. Available at the library or by writing: Publications, 6701 San Pablo Ave., Oakland, CA 94608-1239, or call 1-800-994-8849 within California or 510/642-2431.

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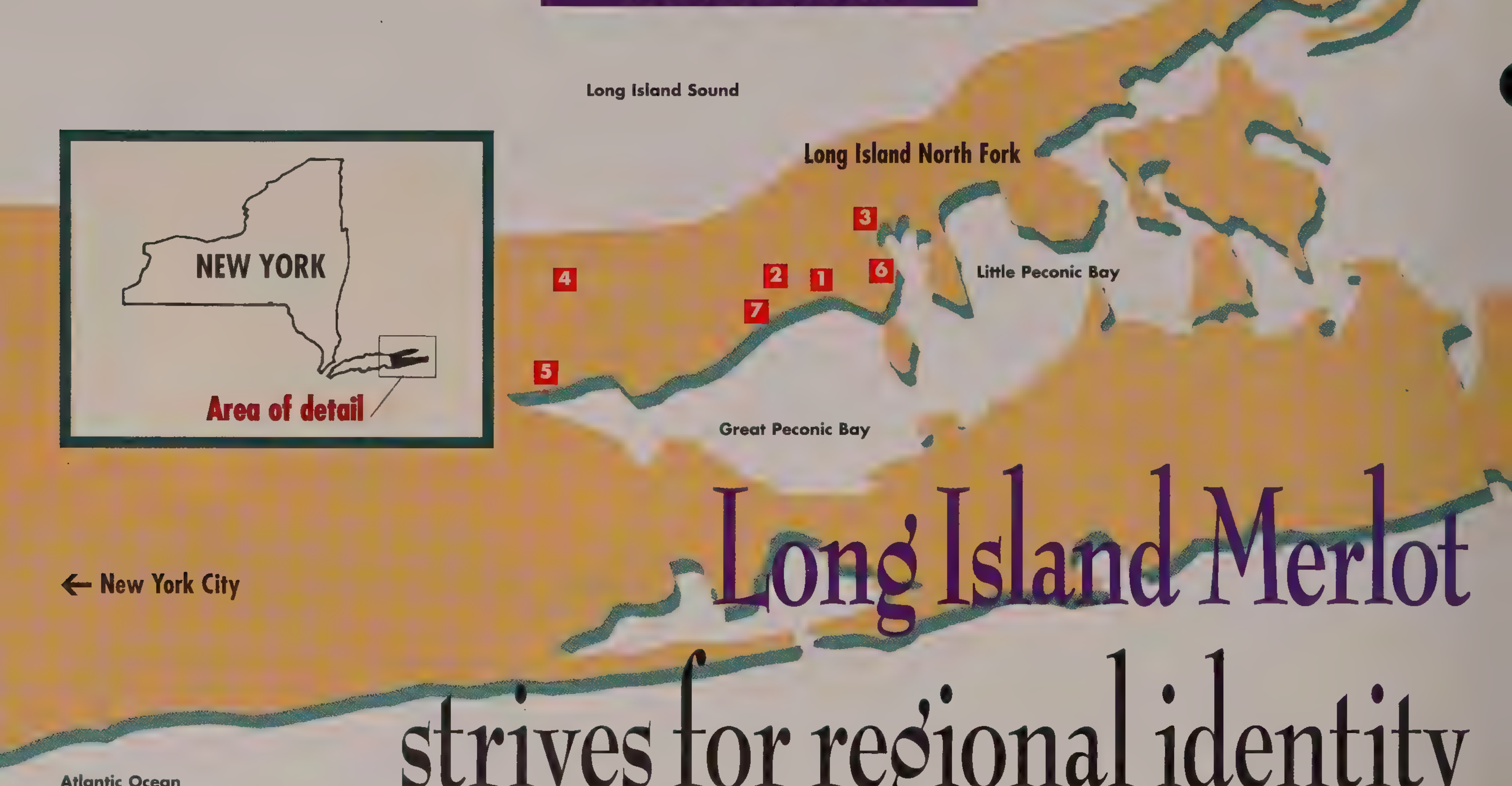

Long Island Merlot strives for regional identity

by Eleanor & Ray Heald

Vintners on Long Island, NY, forecast some years ago that Merlot would become their premier red varietal wine. Since then, they have been challenged to learn more about soil profiles and canopy management, install or retrofit vineyards with the proper trellising, address the need for irrigation, and to define harvest maturities.

Now, as Long Island Merlot vines mature, these efforts are beginning to show both early pioneers and newcomers where the vines grow best and that balanced vines yield wines with distinct flavors and round, ripe, approachable tannins. Today, Long Island Merlots have regional characteristics and are beginning to push to higher quality levels.

Kip Bedell (co-owner/winemaker, Bedell Cellars) believes that supple tannins are the most significant regional characteristic of Long Island Merlot. However, he notes that Long Island has experienced some cool, wet years when tannins were less ripe. He adds that Long Island Merlot always has cherry aromas and in the best years, aromas tend toward black cherry with plum accents.

Louisa Hargrave (co-owner Hargrave Vineyard) also likes the supple tannins of Long Island Merlot. "We get attractive spicy qualities, and overall, it's a very agreeable wine at any age," she maintains. "On the palate, we look for wine with good mouthfeel. It's important to all of us, as part of a new region, to have a wine that people like to drink. At Hargrave, we're now trying to focus on longer ageability — pleasing in youth, but that can go the distance."

Bob Pellegrini (Pellegrini Vineyard) cites the forward fruitiness of Long Island Merlot. "Nobody confuses our Merlot for Cabernet Sauvignon," he stresses. "In some west coast growing regions, I think Merlot can be mistaken for Cabernet Sauvignon."

Vineyards

Erik Fry (Lenz Winery) notes that most Long Island vineyards are evolving toward vertical trellising with catch wires. "Most of us no longer refer to a canopy," he says. "It's a very narrow hedge that maximizes sunlight on the berries. We're doing whatever is necessary, such as leaf pulling beginning a month after full fruit set, in order to maintain this. If you wait too long to strip leaves and suddenly open up bunches to the hot sun, they get sunburn."

Bedell likes to wait as long as possible before the first hedging, but starts before the canes begin to fall over. In spring 1995, there was very vigorous growth early in the season and the first leaf pulling and hedging were needed much earlier. In years like this, a second hedge trimming is necessary by the end of July, to cut canes that weren't cut the first time and to control lateral overgrowth.

Larry Perrine (Perrine Consulting) reports that 3309 is the most common rootstock planted in Long Island vineyards. SO4 (actually 5C) and 5-BB are less common now, but in the late 1970s, these two were just as common as 3309. Growers prefer 3309 because it tends to create a smaller vine than 5-BB or SO4 and has a somewhat shorter growing cycle. "We are just at the point where we're picking rootstocks to match the varieties and the soil profile, " Perrine says. “I think this is the next generation for Long Island.”

Charles Massoud (Paumanok Vineyards) notes that in wet years, vines on 3309 do better because these vines are less vigorous, but in dry years, vines on 5C do better. “One needs to take weather variability into account to get the best answer to the question of which rootstocks,” he notes.

Soil variability

“Long Island vineyards have significant soil differences,” Fry contends. “There are spots that are so sandy that irrigation is a must, but in other blocks where soils are heavier, dry spells are better tolerated.” For this reason, Massoud would like to experiment with “true SO4” because it is drought-resistant.

FEATURED PRODUCERS:

1 **BEDELL CELLARS,** CUTCHOGUE, NY
Kip Bedell

2 **HARGRAVE VINEYARD,** CUTCHOGUE, NY
Louisa & Alex Hargrave

3 **LENZ WINERY,** PECONIC, NY
Eric Fry

4 **PALMER VINEYARDS,** AQUEBOGUE, NY
Dan Kleck

5 **PAUMANOK VINEYARDS,** AQUEBOGUE, NY
Charles Massoud

6 **PECONIC BAY VINEYARDS,** CUTCHOGUE, NY
Ray Blum

7 **PELLEGRINI VINEYARD,** CUTCHOGUE, NY
Russell Hearn & Bob Pellegrini

PERRINE CONSULTING
Larry Perrine

“Due to the number of variables we’re mentioning, I don’t think we’ve yet achieved a Long Island identity for Merlot,” Massoud comments. “Our vines are too young (average of nine years old) and we have too little experience to even consider using the word consistent.”

Ray Blum counters by saying that he thinks Bedell Merlots are consistent. Others think that this may be due to the fact that Bedell vines are the oldest.

Bedell disagrees. “I think it’s a matter of deciding on style and making Merlot consistently in that style. I don’t think it’s a matter of the fruit we’re getting. Of course, we are drawing from principally the same vineyards every year and some other wineries are not. Other wineries have also changed winemakers and we haven’t.”

Louisa Hargrave believes there are certain typical features of Merlot no matter where it’s grown. “Otherwise why would it have a varietal name?” she asks. “Maybe we shouldn’t be using the word `consistent’ when looking at wine from different producers. We should use `distinctive,’ because certainly the supple tannins make Long Island Merlot distinctive, regardless of producer. Because our region is not particularly subject to shatter, we do get a more consistent crop every year.”

Perrine contends that soils make the major difference in wine styles among the producers. Drier sites make leaner wines and in dry years; the resulting wines can be dramatically more tannic and even thin. “Merlot does like a more substantial soil that holds and delivers more water; there’s no getting around this,” he says. “It doesn’t like conditions that are too dry. A winegrower is rewarded with rounder, more supple wines if Merlot is planted in the correct soils. There are distinctions in wine style based on soil types, not just on winemaking techniques.”

“There are sites where it is critical for the installation and correct quality irrigation,” says Russell Hearn, (Pellegrini Vineyards winemaker). “Growers have been fooled into the belief that, although we live in an area *with* substantial summer rainfall, we have sufficient soil moisture for consistent quality and quantity. Less is not always better! Severe and continued stress is not good for quality.”

Balancing crop

“Merlot doesn’t control itself,” Bedell offers. “We have to watch the crop load every year and make decisions about dropping crop.”

Massoud has the opposite problem. “We’re getting only three tons/acre (TPA) or less from 1,300 vines/acre,” he says. “I believe a larger crop would give us better balance. Perhaps increasing the planting density and employing cane pruning will help.”

Hearn believes “how the crop is carried” (clusters per length of shoot) is more important than how much and Pellegrini employs a technique of thinning according to shoot length.

Participants are about equally divided in choosing cane or cordon with spur pruning.

While Hargrave may believe that the region’s Merlot is not as subject to shatter, not everyone agrees. “We can have funky weather around bloom, with five days of rain,” Bedell says. “We’ll get shatter then.”

Dan Kleck’s experience at Palmer Vineyards has shown him that the only time shatter occurs is when there’s a big crop load. After shatter, there’s still plenty of crop. “In this sense, I do think Merlot is self-limiting,” he maintains. “But on Long Island, we see shatter more with Cabernet Sauvignon than with Merlot.”

Harvest maturity

Perrine believes that picking decisions are made based on fruit integrity. By this he means how long the fruit will hang on the vine without succumbing to the vagaries of late-season weather, such as berry splitting or Botrytis. He says there are years when Long Island has the luxury of not having these pressures, giving winemakers a choice of when to pick. “Most years we push it as far as we can, watch the weather carefully, and when we see any funny stuff, we pick it,” he notes.

Fry says that excessive alcohol is never a factor. “Brix levels never get that high,” he reports.

By and large, all Long Island vines are machine-harvested, because there is no migrant labor pool available. Perrine says it would cost twice as much to hand-pick fruit. Additionally, because the grapegrowing region is so small, harvested grapes are not trucked far and grapes hit the crusher quickly without exposure to high temperatures.

Point, counterpoint

Techniques for cap management vary from “fire hose” pump-over at Lenz Winery to punch-down at Pellegrini, a newer winery facility, where all reds are fermented in open-top tanks.

Fry explains his fire hose-pumpover preference. "What I'm going for with Merlot is ultra-violence," he reports. "I want grapes as ripe as possible with a maximum of flavors. Sugar levels are between 22° and 23° Brix, but that's not the relevant criteria in a picking decision. Ripe fruit and ripe tannins are the top priority. This way, when grapes are in the fermentor, all the tannins are good tannins. Therefore, I'm going for extraction by vigorously breaking up the cap and getting some air into the wine."

Massoud questions this theory. Because grapes are so ripe, fermenting juice is nearly black, therefore, he asks, "How much tannin is really left in the skins? I believe, the riper the grapes, the gentler the handling." In 1994, Massoud began irrigating the cap with a sprinkler device.

Kleck also subscribes to the gentle school. "The majority of Long Island Merlots are consumed long before they're ready and have little need for massive tannins," he says. "I don't believe that in the vineyard we're getting tannins as round and ripe as we'd like them. At Palmer, we're trying to make wines that match the timing in which they will be consumed. We've backed off extended maceration and opt for gentler cap handling. We do gentle pumpovers during active fermentation, and the cap is broken up once."

Kleck also says vineyards with soil variations have vines with berries of different sizes, and this relates to tannin levels. Smaller berries have severe tannins while larger berries bear less tannins. Unfortunately, he says, he deals with both berry sizes. "Therefore, I have to make the wine accordingly."

Hearn believes that minimizing the non-soluble solids liberated from aggressive handling in the fermentor is the goal. Shearing pulp, scarring seeds, or raising them off the bottom of the fermentor are all negatives (extracting hard tannins). "Merlot is a variety that can be dominated (negatively affected) by seed-based tannins," says Hearn. "My goal is to maximize the extraction from the skins and balance with a small quantity of seed tannins."

***PWV** thanks Pellegrini Vineyards for hosting the tasting/discussion.*

PRODUCTION FOCUS

Bedell Cellars

Cutchogue, NY
Kip Bedell, winemaker

Style

Kip Bedell strives for a Merlot with red cherry, black cherry, and plum aromas with bright full flavors, emphasizing fruit with rich, but soft tannins.

To augment this style, canopy management, shoot positioning, and exposing fruit to light have been the most important focus at Bedell Cellars over the last several years.

Based on taste and pH, grapes are harvested between 21° and 22° Brix, with 0.65 to 0.75 TA, and pH less than 3.5.

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Winemaking

After a light crushing, sufficient just to break skins, and a one or two-day cold soak, must is inoculated with Pasteur Red ADY. During a five to seven-day fermentation in closed-top fermentors, maximum juice temperature reaches 85°F. The cap is pumped over twice daily for 20 to 30 minutes.

With pressing approximately 14 days past dryness, total skin contact is 21 days. From a 175 gal/ton press yield, generally all press wine is added back.

Hot fermentation and monitoring of pH are important factors in achieving color and color stability.

Inoculation with *viniflora oenos* ML bacteria is done near the end of primary fermentation. In some years, acid adjustments reduce pH after MLF completes. Then, the first addition of SO_2 is made at 50ppm. In December, wine is barreled in new to four-year-old American oak for 12 to 14 months. In barrel, free SO_2 level is maintained at 0.80 molecular, and wine is racked with some aeration once in the spring.

Three to four months before bottling, wine is blended with five to 10% Cabernet Sauvignon. It is given one light filtration before bottling, 18 months after harvest, and bottle-aged six to nine months before release.

Hargrave Vineyard

Cutchogue, NY

Louisa & Alex Hargrave, winemakers

Style

Louisa and Alex Hargrave try to emphasize delicate violet scents which offer uniqueness to the aroma while flavors reveal the hard and soft elements of the soil. Redefining the classic Merlot and showcasing opulent, powerful, deep, and explosive fruit components in a wine with ageability are their consistent goals.

In addition to good vintages over the past few years, increasing cap temperature during fermentation and inoculation for MLF during primary fermentation are new techniques contributing to attainment of stylistic goals.

Grape skin color and condition and TA less than 0.95 prior to MLF are the principal harvest parameters.

Winemaking

To spread out the cap, fermentation is done in 3,500-gal tanks which are inoculated from a starter of various yeast strains after crush. During a 10-day fermentation where maximum juice temperature reaches 87°F, the cap is sprinkled daily for a length of time that is temperature-dependent.

Pressing is done at dryness and yields an average of 160 gal/ton. Generally, all press wine is added back.

Chr. Hansen ML bacteria strain is used. Once MLF completes, 15ppm SO_2 is added.

The slightly more than two-year barrel regime begins at the end of November in Nevers cooperage averaging two to three years old. Wine is racked every six months, with aeration early on in the regime. Free SO_2 level is maintained at 18ppm.

Blending of barrel lots is done at Easter following the harvest. Vintages are rarely blended with another red varietal because even 5% makes a powerful shift in impression and feel, the last being 1990.

When possible, wines are bottled unfined and unfiltered when the winemakers believe they are ready. At that time, 100 cases are bottled as a trial and full production bottling is done in three months. Bottle ageing time before release varies with the wine and vintage.

Lenz Winery

Peconic, NY

Eric Fry, winemaker

Style

Believing that Long Island Merlot can be more aggressive and full-bodied than Merlot from many other regions, Eric Fry strives for full expression of ripe, varietally consistent fruit flavors in a full-bodied wine with soft, ripe tannins. Integration of oak, fruit, and reductive character is also important.

Over the past few years, the following improvements in Lenz vineyards have affected style and wine quality: soil improvement by macro and

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Henry Ford talking about his Model T.

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micronutrient balancing; strict trellis management, stressing balance and exposure; and insistence on fruit ripeness at harvest.

Grapes are harvested solely on taste. Brix levels range between 21.0° and 21.5°.

Winemaking

Mechanically-harvested grapes have about 60 to 70% berry maceration. Inoculation with Prise de Mousse ADY is done immediately.

Fermentation proceeds in closed-top fermentors with pumpovers done at varying frequencies and time lengths. Maximum temperature during a three to five-day fermentation reaches 86° to 88°F.

Malolactic fermentation is initiated by inoculation with *viniflora oenos* ML bacteria.

Pressing time is decided by wine taste with yields about 170 gal/ton. Decisions about use of press wine are vintage dependent. Immediately after pressing, wine is barreled in principally Nevers cooperage of mixed age for 12 to 18 months.

Once MLF completes, SO_2 is added at 40 to 60ppm. In barrel, the free SO_2 level is monitored at 24 to 32ppm. Racking is done in January, September, and May usually without aeration.

Blending decisions can be made at harvest or at racking. Cabernet Franc may be blended at 5% to 10% based on flavor and structure balancing.

In June or July, two years post-harvest, wine is bottled unfined and unfiltered and aged a year or more before release.

Palmer Vineyards

Aquebogue, NY

Dan Kleck, winemaker

Style

In Palmer Vineyard's Merlot, depending on the vineyard site and vintage, Dan Kleck says aromatics can range from herbal to berrylike and jammy. Also, bright fruit flavors can range from fresh herbal-strawberry and red cherry to the riper styles which exhibit sweet cherry and plum flavors.

Within this panorama, Kleck's goal is to produce a fresh, flavorful, and supple Merlot emphasizing the clear fruit flavors, supported by ample soft and ripe tannins. These components are balanced by a touch of toasty, vanilla oak flavors.

In recent years, Kleck credits the following vineyard improvements and decisions with elevating overall wine quality: better canopy management, maximizing the fruit's ripeness and flavor profile; improved disease management for longer hang time; and later harvesting for more supple flavors and tannins.

Grapes are harvested when berries are softening, leaves are beginning to pale and senesce, generally between 21° and 22° Brix. At these sugars, TA is about 0.75 with 3.4 pH.

Winemaking

Two to three days after crush, closed tanks are either inoculated with Pasteur Red ADY or left uninoculated. Fermentation completes in five to 10 days with maximum temperature reaching 92°F. The cap is pumped over twice daily, for the first 10 days. Thereafter, it's pumped over daily. Total maceration time varies by vineyard block and vintage conditions, anywhere from eight to 21 days.

Pressing is done between two and 15 days post dryness with yields of 165 gal/ton. Press wine is not used. MLF proceeds without inoculation. At the first racking post-MLF, a first SO_2 addition of 25ppm is made.

In mid-winter, wine is barreled one year in 20% new to five-year-old cooperage that is 80% Nevers and 20% American. Racking is done every four to six months, with free SO_2 level at eight to 15ppm.

One to four months before bottling, wine is blended with up to 5% Cabernet Sauvignon to improve structure and ageability and with 3% to 25% Cabernet Franc for improved delicacy and aroma.

When needed, fining with four to six egg whites per barrel is done in the middle of the ageing process. It is racked in one to three months.

Twenty months after harvest, the wine is bottled unfiltered and given a four to eight-month bottle ageing before release.

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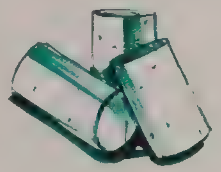

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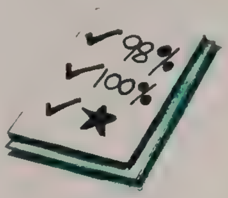

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Paumanok Vineyards

Aquebogue, NY
Charles Massoud, winemaker

Style

While Charles Massoud experiences variation and a broad range of aromas and flavors from year to year with his young vines, he aims to produce a wine of early drinkability that is easily matched with food.

For the last few years, Massoud has relied less on pH and more on texture and fruit aromas to judge ripeness. Additionally, he credits improved quality to inoculating primary fermentation with T-73 yeast and irrigating the cap rather than pumping over.

Based on aroma, texture, and flavor, grapes are harvested between 21° and 22.5° Brix with TA about 0.60, and pH of 3.6.

Winemaking

Mechanical harvesting yields about 80% berry maceration. After soaking for 48 hours, closed-top tanks are inoculated with T-73 ADY. Fermentation completes in seven days with maximum 85°F temperature. The cap is sprinkled three times daily for 30 minutes.

Viniflora oenos is the ML inoculum added when the wine is nearly dry, but still warm, to get a good start (usually around 0°Brix.

Wine is pressed 10 days post-dryness with yields of 160 gal/ton. Depending on the vintage, press wine may or may not be added back. Wine is settled in tank, racked, and barreled. The first SO_2 addition of 30ppm is made at the first barrel racking in one year of barrel ageing. A mix of American and French cooperage averages 1.5 years old.

Barrels are racked every four months, with the first being an aerative racking. Free SO_2 level is maintained at 20ppm.

To elevate mid-palate perception, 10% Cabernet Franc is blended in.

After the second racking, an egg white fining is done and barrels are racked in one month. At bottling, a 0.40μ membrane is used.

Peconic Bay Vineyards

Cutchogue, NY
Ray Blum, winemaker

Style

Ray Blum's straight-forward goal is production of a full-bodied, American oak-aged red wine. The wine has an aroma of clear, clean cedar that intermingles with the powerful notes of fresh black cherry and raspberry. There is a lush black cherry/blackberry flavor with smokiness and vanilla from American oak barrels.

Recent important improvements include retraining and re-trellising of grapevines to a low-wire cordon system. The fruit is left on the vine to achieve a higher pH range (3.3 to 3.4) rather than relying on a measurement of Brix only. The Merlot vines have matured in the last three excellent growing seasons.

Brix at about 22° and pH around 3.3 to 3.4 are the most important harvest parameters.

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Winemaking

Between 50% and 75% berry maceration occurs at crush. Inoculation with Pasteur Red ADY is done immediately. Fermentation completes in closed tanks in 14 days with maximum temperature of 80°F. The cap is punched down and pumped over twice daily for 15 minutes.

Pressing is done not earlier than 10 days post dryness to yield 180 gal/ton, with approximately 21 days of skin contact. Press wine is added back.

MLF is uninoculated. Once complete, a first SO_2 addition of 50 ppm is made.

In early December, wine is transferred to American oak barrels of varying age for one year. Racking is done every three months, and the free SO_2 level is maintained at 30ppm. After six months in barrel, an egg white fining is done, and wine is racked in 30 days.

Before bottling in the second winter after harvest, blending with 15% Cabernet Sauvignon is done to add structure. The wine also receives a pad filtration.

Pellegrini Vineyard

Cutchogue, NY
Russell Hearn, winemaker

Style

Russell Hearn says Pellegrini Merlot's aromas span the gamut from cherry through dark stone fruits such as plums and blueberries. Flavors are mirrored in a wine that is fruit-driven with subtle tannin structure.

To achieve goals, strict shoot length and the number of clusters retained are monitored during the growing season. To add complexity, partial barrel fermentation is done on individual lots and punch-down cap management is done to draw oxygen into the fermentor.

Grapes are harvested between 22° and 23° Brix while there is still an active canopy. TA is about 0.6 with a pH approximately 3.45. Fruit development and flavor are the critical picking parameters.

Winemaking

About 50% whole berries (completely de-stemmed) are fermented in open-top fermentors. After a three-day cold (50°F) soak, juice is inoculated with T-73 ADY and warmed to 85°F within six hours. At about 6% alcohol, the ferment is cooled to 70°F to finish at cooler temperatures.

Fermentation completes in about 10 days with maximum temperature of 85°F. The cap is punched down four times daily for 15 minutes at the beginning, less towards the end. Total skin contact time before pressing is 25 to 28 days. The press yield is 170 gal/ton. Press wine is vinified separately for six to nine months before being selectively blended back.

Inoculation for MLF is at 2° Brix with predominately Chr. Hansen ML culture. The first SO_2 addition of 40ppm is made 16 months post-harvest.

The barrel regime has two parts: about 30% of the wine is transferred to 500L barrels during fermentation (at 12° to 14° Brix). The balance is barreled 10 days post-pressing after aerative rackings in tanks every two to three days. Cooperage varies in age from one to seven years and is a mix of 80% French and 20% American oak. Time in oak is 22 to 24 months.

In the first year, wine is racked four times, the first to third rackings may be with aeration. Racking is done twice in the second year. After the second racking in the first year, wine is fined with two to four egg whites per barrel and racked after two to four weeks.

Within nine to 12 months after harvest, blending decisions are made. Cabernet Franc is chosen for its raspberry, menthol character that lifts and enhances the aroma. Cabernet Sauvignon enhances the end-palate tannin and broadens the wine.

Wine is bottled unfiltered in September, two years post-harvest and bottle-aged six to nine months before release. ■

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Wine in glass bottles

by Don Henfling

Photo by Fred Lyon

Wine bottles may have been developed first in England in the mid-17th century. Early wine bottles were glass containers with high shoulders and long thin necks. Most had a kick or concave bottom. Typically there was a flange just below the neck so that a string or wire holding a conical cork in the bottle could be tied off to this flange.

The bottles were typically dark green glass which protected the wine from sunlight, although it may also have prevented the winemaker from inspecting for oxidation. By the middle of the 18th century, new words appeared to describe large glass wine bottles. Demijohn was probably from the old French "dame jeanne" and carboy was probably a corruption of the Persian "garabah".[1]

Today, wine is packaged in glass bottles of traditional shapes which are representative of the region of Europe from where each grape varietal is grown. Cabernet Sauvignon, Merlot, and Sauvignon Blanc come in Bordeaux (claret) bottles and Pinot Noir, Chardonnay, and Rhone varietals (such as Syrah) come in Burgundy bottles. Riesling and Gewurztraminer typically are bottled in hock (sometimes called Alsatian) bottles.

Push-up bottoms

Wine bottles were historically produced with push-up or concave bottoms. There are several anecdotal stories as to why this structure was first used:

1) The push-up made the bottles easier and more stable to pack with the neck of one bottle nestled into the push-up bottom of the bottle on top of it.

2) When bottles were blown by hand, a protruding scar was left on the bottom of the bottle which would make the resulting bottle bottom slightly convex and therefore unstable. Hence a push-up bottom allowed the bottle to sit on the bottle's perimeter.

3) The push-up allowed service staff to hold the bottle with their thumb in the push-up in a decorous pouring ceremony.

4) The flat bottom of a bottle is a structurally weak area (Force equals pressure X area, and the bottom of a bottle is a large flat surface area, so a bottled wine that is finishing primary or ML-fermentation can produce enough CO_2-gas pressure to break a flat-bottom bottle.)

The push-up is no longer structurally necessary. Jim Takahashi at Domaine Chandon, (Yountville, CA) remembers one pallet of bottles intended for a major sparkling apple juice producer that was mistakenly shipped to Domaine Chandon. As the bottles were very similar to the standard sparkling wine bottle being used, some were loaded onto the tirage (filling) line before someone noticed they lacked a push-up (punt). The line was stopped, and these bottles were cleared. The few dozens which actually got filled and capped were kept separate as an experiment and allowed to undergo the secondary fermentation of the *méthode champenoise*.

None of the "flat-bottom" (the bottom is slightly concave) bottles broke in tirage, even under the nominal eight volumes per bottle volume of CO_2 gas pressure, and were successfully disgorged, corked, and wired. Nevertheless, tradition dictates that quality wine bottles are molded with a push-up bottom. Domaine Chandon even specifies a deeper than normal push-up in their bottle design to aid in the ceremony of pouring.

Determining bottle quality

The following quality checks can help you select the appropriate bottles for your wine. First, when examining a push-up bottle's aesthetics, note that with liquid in the bottle, the push-up appears flatter and broader.

1. Inside neck diameter:

Use inside-measuring calipers to check bottle samples to insure that the inside neck opening is round (not oval), and that the inside walls are parallel (that the inside neck walls do not flare in or out more than 1 or 2 mm) for the top 1.5 inches of the neck. For a 750-ml bottle using a 24-mm diameter cork, a typical range of acceptable inside-neck diameters would be 18mm to 21mm (0.71" - 0.83"). Typically, the inside neck diameter at the top will be slightly smaller than the inside neck opening lower on the neck. The bottle manufacturer should supply you with its production tolerances.

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2. Fill volume:

Be aware that the Bureau of Alcohol, Tobacco & Firearms (BATF) specifies the following bottle sizes for use by wineries: 50-ml, 100-ml, 187-ml, 375-ml, 500-ml, 750-ml, 1,000-ml (1-liter), 1.5-liters, 3-liter, 4-liter.

Determine the variation in 750-ml wine bottle capacity using the following procedure. Weigh several empty bottles, noting each bottle's weight. Add distilled (DI) water at 20°C to each bottle until the fill height is 60mm to 64mm from the top of the bottle. Use the fill height specified by the bottle manufacturer. This height allows enough space for a 44-45mm cork and leaves 15mm to 20mm for ullage. Weigh each filled bottle, then subtract out the weight of the empty bottle. Divide the result (the weight of the water) by 0.9982, the specific gravity of the water at 20°C, to get the volume of the water in milliliters. Ideally, the volume should be 750 ml. If it isn't, adjust the fill height on your bottle filler to achieve a 750-ml capacity.

Even though a run of bottles may look identical, there is variation in their capacity. As an example, 48 random (750-ml capacity) wine bottles were each filled with 750 ml of 20°C water, and the distance from the top of the water to the top of the bottle was measured for each bottle. The minimum distance observed was 40.72mm, and the maximum distance was 65.81mm. This variation of 25.09mm equals a variation in the fill height of almost an inch if exactly 750ml of wine is put in each bottle. It makes it difficult to put a 1.75-inch long cork (44-45mm long) in a space that is only 40.72mm long.

In addition, fill volumes are subject to government regulations.

A BATF-regulation (Section 24.255[b]) concerning fill of wine containers states that individual containers may vary from the amount stated on the label by no more than 1.5% for 1 to 14.9 liters, 2.0% for 750ml, and 3.0% for 375ml. In any case, there will be as many bottles overfilled as there are bottles underfilled for each lot of wine bottled. Fill tests must be conducted to determine that the volume of wine is in agreement with the amount stated on the label (section 24.255 [d]).

The BATF stipulates under tax tolerances that from six consecutive tax return periods (two tax periods per month) during bottling, there will be no additional tax due if the average actual wine volume is equal to that of the stated container volume or up to 0.5% above that volume.

Therefore, in a 750ml bottle, the average volume dispensed per bottle must be from 750ml to 753.75ml. The BATF wants to collect all its taxes, and if you're providing customers with more than 750ml of wine, and the BATF is collecting taxes on only the stated 750ml, then the government is losing revenue.

Unfortunately in California, the Division of Measurement Standards within the Department of Agriculture (and similar agencies in other states) has a different requirement regarding fill levels. It requires that the average weight/volume in a lot of containers at the time of sale may not be less than that stated on the container. In addition, there can be no "unreasonable minus errors," even when there are enough positive errors to yield a positive weight/volume average. This caveat prevents sloppy packaging, which isn't much of a problem in filling wine bottles.

When testing for compliance, the Division of Measurement Standards performs a random audit on several wine bottles at the winery or a retail outlet and then averages the volume per container. If it appears that there is a problem with low fills, then a more rigorous sampling plan is initiated so that any conclusions yield statistically-significant results.

Complying with both agencies is difficult given the capacity variations of wine bottles. Add to this the marketing stipulation that all your fill heights must look uniform, and suddenly there are many constraints on quality control of bottles.

Wineries that comply with these regulations aim for a fill volume of 750ml (and not underfill). Quality checks are made by weighing random, empty bottles. A rubber band and ID tag are attached around the neck of each bottle, and they are sent through the bottling line so that several filler spouts are utilized. The filled bottles are reweighed, and the volume of wine determined. Adjustments can then be made to the filler spouts to

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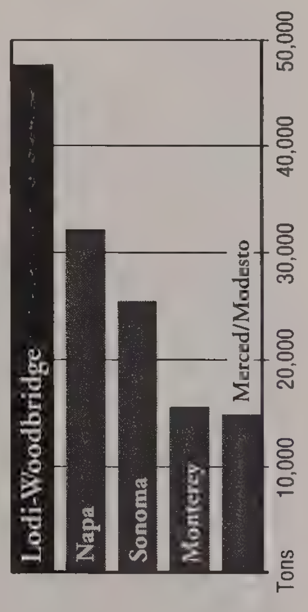

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BATF Section 24.255 (d) requires that fill tests be conducted at representative intervals of wine bottling. Section 24.308(c) requires that records of fill tests be maintained for each lot of wine bottled. Records should show date, time, item tested, and results.

3. Color standards

Wineries report little problem with color consistency, except with colors such as dead leaf green, smoke, and antique green. These are difficult colors for bottle manufacturers to produce consistently. As little as two ounces of carbon can affect the color of a 250-ton batch of glass.

Ball-Foster Glass Co. produces dead leaf green year-round and they feel this enables them to maintain color consistency.

Recently, manufacturers have been mandated to buy crushed, used glass (called "cullet") which is melted and blended into their production of new bottles. Although this saves a considerable amount of energy — and thereby helps to hold down glass costs — it is another factor affecting bottle color.

Anchor Glass Co. has established a "frit" process where a large furnace feeds into a smaller furnace so batches of colored glass can be mixed and produced. They hope to produce short runs of less popular bottle colors to complement their Mexican facilities and to compete with Italian and French producers who use small 20 to 60-ton furnaces as compared to the typical 350-ton furnaces found in domestic glass manufacturing plants. Anchor is the first domestic supplier to produce "antique green" glass using this process.

Glass producers will send you samples from the bottle run, so you can compare the sample's color and other specifications to those of the main bottle order.

Within the last few years, manufacturers have developed many bottle shapes and colors to choose from, but before choosing a particular bottle, consider how your label looks on the bottle, whether the bottle will work on your bottling line, how the bottle color appears when filled with your wine, for example claret bottles will handle far taller labels than Burgundy bottles, and whether the bottle will fit on your retailers' shelves.

4. Glass coatings

An FDA-approved coating is typically sprayed on the outside of wine bottles to provide scratch resistance, mainly from bottle-to-bottle contact. Soon after the bottle leaves the molds, tin or titanium tetrachloride is misted onto the outside of the bottle where it adheres to the hot glass. Later, when the glass has cooled, a water-soluble compound of polyethylene or oleic acid is sprayed onto the outside of the bottle. It binds with the previous metallic coating, and any excess washes off the bottle.

Polyethylene seems to be the more popular coating for wine bottles. It is more durable than the oleic acid and also provides more resistance to bottle scuffing. This is especially important when bottles are shipped in bulk where the glass bottles can jostle against each other. Be aware that some label glues are compatible with only one type of coating. Cooordinate the label, glue, and bottle coating before bottling commences.

5. Ultra-violet light inhibitors in glass

Glass is primarily composed of silica. Soda ash, lime, or potash are added to lower the melting point and add stability during the glass-molding process. Oxides of various metals such as iron, chrome, nickel, copper, and manganese are used to produce glass colors, mainly in shades of green or brown.

Fortunately, glass naturally filters out some of the higher-energy ultra-violet (UV) range of the light spectrum (375-440 nanometers). Amber glass absorbs more UV light than green glass, which absorbs more than clear glass. Short-wavelength light can initiate detrimental chemical changes in wine.

According to tests conducted by Owens-Brockway Glass on 2-mm thick samples of its glass, amber filters out about 97% to 98% of the UV; dead leaf green filters out 49% to 55% of the UV; Georgia green filters out 13% to 14% of the UV; while flint filters out about 10% of the UV.

Champagne green (without inhibitors) filters out 26% to 50% of the UV. At the request of sparkling wine producers, most glass manufacturers have added a UV inhibitor to their Champagne green glass. The main reason for this request is that sparkling wine (and perhaps Sauvignon Blanc or

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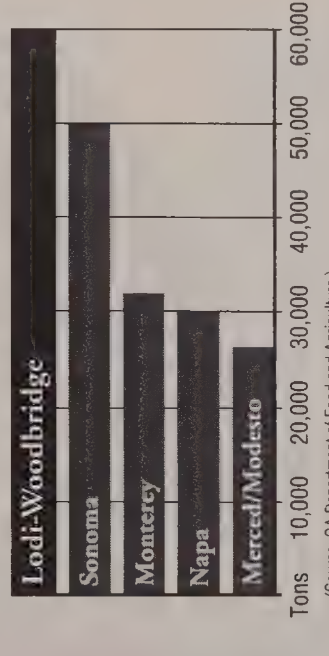

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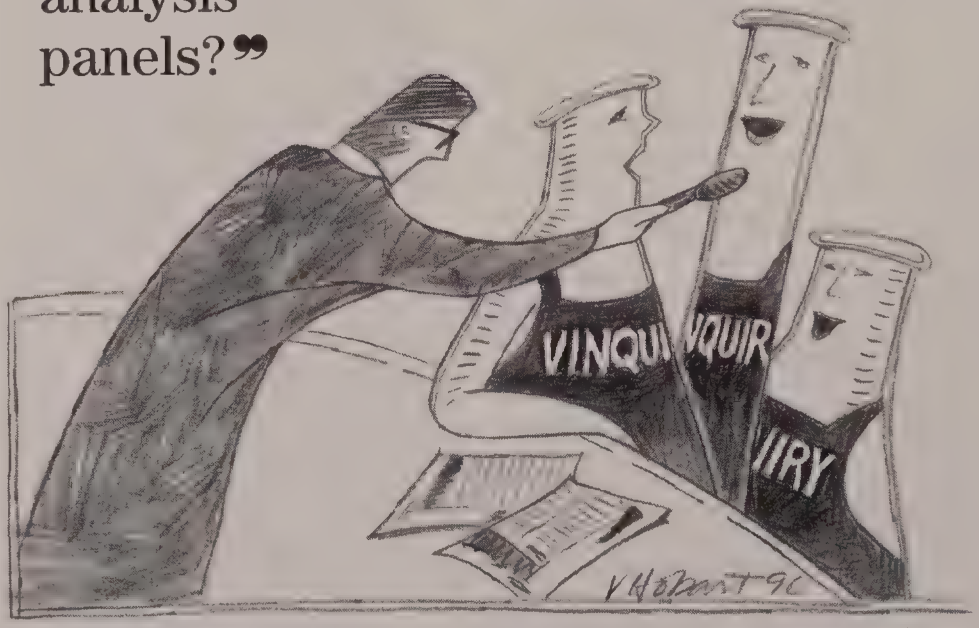

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Chardonnay that is sur-lies aged) is in contact with the yeast for a long time. Breakdown of the amino acids in yeast yields thiol compounds.

UV light can initiate sulfide-producing reactions in thiols, hence the need to shield the wine from UV light. This is especially true if a retailer stacks wine bottles on the top shelf where it is close to UV-producing fluorescent lighting. As mentioned in ***PWV*** (May/June '92, pp 37-44), these same reactions are initiated by moderately-high temperatures that can occur when wine is shipped for distribution, unless the wine is protected by SO_2.

Sulfur-containing amino acids in the presence of photosensitizers, such as riboflavin, decompose to form H_2S and other sulfur compounds. The resulting wines are called lightstruck or sunstruck and contain decreased citrus aromas and increased aromas described as cooked cabbage, corn nuts, wet dog/wool, and soy/marmite.

Significant aroma differences could be detected in a still white wine in a flint bottle after 3.4 hours of exposure to two 40-watt fluorescent lights 35cm from the flint bottle. In green bottles, significant differences were detected after 18 hours.[2]

6. Tests for general bottle condition:

a) Measure the bottle height for consistency. This affects the cork insert depth, which indirectly affects the ullage.

b) Look for any imperfections in the glass or shape of the bottle. These are rare, but can include: a bent bottle neck, fused glass particles adhered to the inside of the bottle, glass spanning the inside diameter of the bottle (called a birdswing), and any sharp ridges projecting above the lip (called an overpress).

New trends in glass bottles

Tradition dictates that quality wine bottles are molded with a push-up bottom. Push-up bottles weigh more than flat-bottom bottles. Heavier bottles cost more; however the "fighting varietals" need to project an image of quality while holding down cost. This has led to lighter push-up bottles that cost less to produce. Since this segment of the market requires a large number of bottles, glass manufacturers have responded to this need.

Glass manufacturers are able to produce a lightweight push-up bottle by using a narrow-neck press and blow technique which they already use for the beer and food industry. A measured gob of molten glass is first formed in a neck mold and then the rest of the bottle shape is blown in a separate mold. This process is somewhat slower than the traditional blow and blow technique used to make push-up bottles.

"Owens-Brockway Glass (Oakland, CA) is now producing a 15-ounce push-up glass bottle in both claret and Burgundy styles that is economical, yet just as strong as a traditional 19- to 21-ounce push-up bottle," reports Terry Sanzo, account manager. "Quality control is especially crucial for non-screw-top closures in the inside neck dimensions."

Ball-Foster Glass Container Co. produces a 14-ounce flat-bottom wine bottle and a 17-ounce push-up bottle using the blow and blow technique. "We are aiming for production of a 12.5-ounce flat-bottom 750-ml bottle using the narrow-neck press and blow technique," says George Bishop, northern California account manager.

The push-up in these lightweight bottles is not as pronounced as it is in heavier bottles. However, with liquid in the bottle, the push-up appears taller and broader than when the bottle is empty.

Ironically, as one segment of the market is looking to cut bottle costs, the premium wine market has discovered bottles as a marketing tool and is spending money on molds and designers to produce new bottle shapes and styles.

Designers are integrating bottle design, labels, and capsules in a complete package to catch the consumers' attention. Ever since the ban of lead capsules and introduction of the flange bottle top by the Robert Mondavi Winery, the glass industry has responded by offering distinctive styles, colors, and shapes of wine bottles to wineries.

"Anchor Glass has organized a 'New Product Development team' that draws from sales, mold design, bottle design, carton graphics, and engineering to help wineries design distinctive marketing packages," says Lee Whalen, wine industry sales manager.

"We can take a new idea from inception to production in an average 16 weeks," continues Whalen. "Our goal is nine weeks. Computer-aided design allows projecting an image of the bottle on a screen and modifying its shape while the computer keeps volume capacity constant. A winery's label can be scanned into the computer and made to appear wrapped around the bottle; even the bottle color can be changed as it would appear with the appropriate color of wine in the bottle."

Conclusion

Though the aesthetic spectrum of glass wine bottles now available to the winemaker is matched by quality-conscious production techniques, the winery must provide basic quality checks to ensure compliance with government, production, and marketing standards. ■

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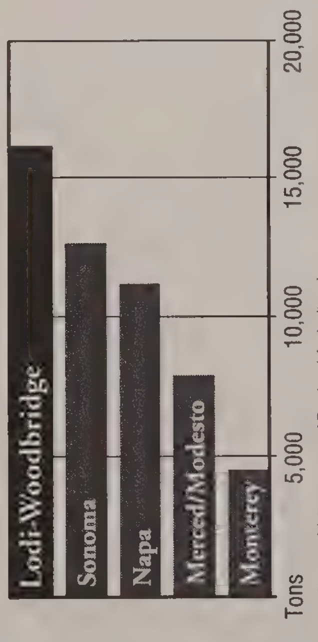
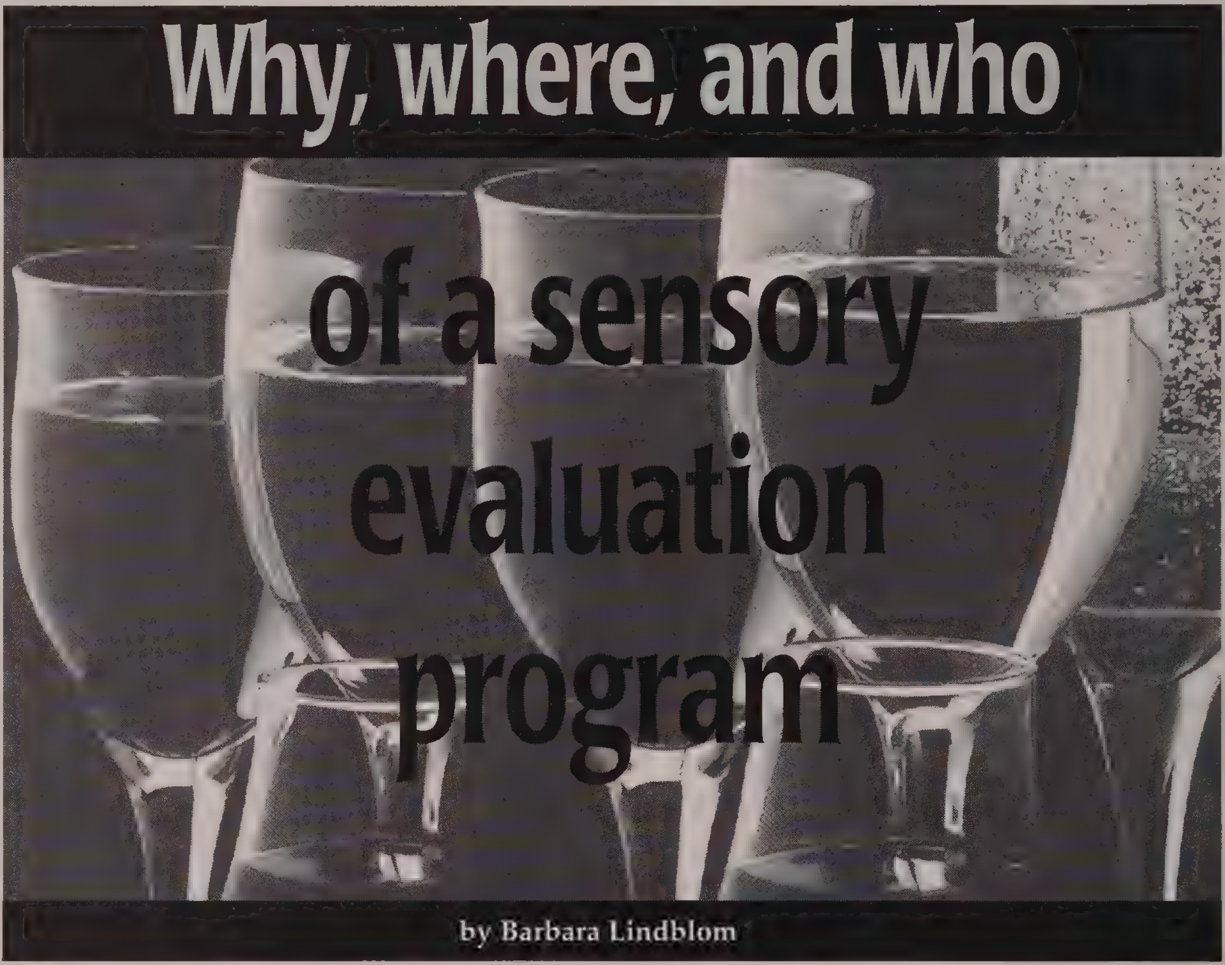


(Source: CA Department of Food and Agriculture.)

Why, where, and who of a sensory evaluation program

by Barbara Lindblom



We explored some of the advantages of sensory evaluation principles and techniques in the March/April'96-**PWV**, when we reviewed the work being done at Beringer Vineyards (St. Helena, CA) by Jane Robichaud.

In the next two articles, we will review some of the practical aspects of sensory evaluation and ways in which any winery might apply them to maximize its resources.

There are a number of reasons why these principles and techniques haven't been employed to a greater degree in the wine industry:

- There is a long tradition and profound confidence in expert tasters' abilities.
- Quality assessment is of paramount importance in the winemaking process but presents difficulties for scientific sensory techniques.
- There are limited resources and only so much time at any winery's disposal. Scientific design and statistical analysis do demand certain investments.

It might not be practical or appropriate for many wineries to institute the extensive kind of sensory evaluation program that is operating at Beringer. However, there are tangible benefits for any winery that augments traditional tasting methods by applying some of the principles and techniques that have become so integral to production of other foods and beverages.[3]

Just as with stability or chemical analysis programs, any tasting or sensory evaluation program should be well-suited to the specific needs of the individual winery.

A program might be simple and spontaneous or sophisticated and carefully designed. But regardless of its degree of complexity or depth, it should always generate meaningful results and contribute positively to production decisions and to communication within the winery and with the market.

A sensory evaluation or tasting program should include: specific objectives, a location for the tastings, tasters, specific tasting protocols, and consistent methods for evaluation and application of results. Also of primary importance — there must be support within the winery for any program to serve as a truly useful tool.

The following is a discussion of the steps involved in establishing or fine-tuning a sensory program. It reflects the "why, where, and who" of tasting.

"Why" — Objectives

According to Emile Peynaud, "A taster needs to have a particular reason for tasting if he is to do so effectively."[1] This principle applies to the most routine production tasting and to the most complex sensory or tasting program.

In many ways, defining the objective is the most critical step in determining and clearly defining ***realistic*** goals. All other details of a program (or even of a single tasting) should follow as a function of the objective(s).

Why is this definition and evaluation of objectives so important?

- It helps direct realistic and economic use of resources.
- It establishes appropriate degrees of precision and detail.
- It facilitates the assessment of how well any program relates to the "bottom line."

Once the objectives are clearly set, the decisions about design and investment of resources will be a good deal simpler. The objectives for any winery's tasting program generally include: maintenance and improvement of quality; definition of style; identifying the nature and source of problems; education (of staff, the market, or the consumer); and fostering communication within the organization and with the consumer.

Any objectives can apply to an individual tasting or an entire program. Examples of some "stated" objectives are given below and will be referred to throughout the article:

To conduct a routine survey of production lots: Evaluate the general soundness of each lot; select potential reserve lots; and determine the schedule and format for the next tasting(s).

To evaluate trials and experiments: Determine the significance of the differences in a trial; define the nature of those differences (ordinarily by descriptive means); evaluate consistency with established style and quality goals; and evaluate the appropriate investment of resources.

To obtain appropriate fruit: The winemaker and grower develop a common vocabulary which is clear to everyone about the specific wine; use that vocabulary to communicate the desirable and/or undesirable attributes; and continue to use that same vocabulary to evaluate the results.

To improve communication with the market in order to improve sales: Establish a clear, specific, consistent, and accurate definition of wine style; communicate the style to winery personnel and the market; and then verify that this message is clear and that it reflects the way the wine is experienced by the consumer.

Whatever the initial objective(s), in order to ensure the most efficient use of resources, it's advisable to continue to refer to the objectives periodically in order to verify that the program is actually achieving the stated goals.

Sometimes as a project progresses, it becomes apparent that additional or different objectives have taken precedence. When this happens, the new objective(s) should not be assumed. They need to be as carefully defined as were the original objectives.

"Where" — Location

Peynaud states, "Inaccurate tasting and the fact that results cannot always be duplicated (which means they cannot be verified) can most often be explained by inadequate working conditions....The fact that the taster is aware of external influences and consciously isolates himself from them is not enough."[1]

Concentration is the most important requirement for the tasting process, consequently the primary concern in choosing, or creating, a tasting location should be to provide an environment which promotes concentration.

Seclusion and freedom from distractions and interruption are critical.[5] Interruptions can include interference by other tasters. On the other hand, tasters often need to communicate at some point. Consequently, isolation booths are not practical in all situations, but providing some semblance of isolation is important.

Many wineries have dedicated production-tasting rooms. Generally, they are near other production locations but are isolated enough to accomplish many of the objectives discussed in this section. Even a table in an office or conference room can promote concentration as long as the door can be closed and the telephone muted.

Some factors affect both concentration and sensory response:

Interfering aromas are detrimental. Even aromas from the samples themselves can have a fatiguing effect. In the technical-tasting room at Sonoma-Cutrer Vineyards (Windsor, CA), there is specifically designed, directional air flow providing a refreshed air supply to the tasters.

Citing detailed studies of tasting conditions he conducted with his colleagues, J. Puisais contends that it is ideal to completely replace the air in the tasting room ten times/hour.[2] A less elaborate, if only partial, solution is to provide the tasting area with windows that can be opened for fresh air. Of course this function can be foiled by an aromatic garden or highway just outside the window.

Noise not only interferes with concentration, it diminishes the acuteness of the other senses. Any extraneous noise that requires a response on the part of the taster is particularly undesirable. But even background noise can affect the taster's effectiveness.

The level and the type of light can influence not only perception of wine color, but also wine quality. If the greatest differentiation of color is desired, daylight, or daylight-simulating lights, would be preferred.[1]

Temperature of the room can also adversely affect tasting results by affecting the temperature of the wine as well as discomforting and thereby distracting the taster.[1,5]

According to Puisais, certain colors in the decor of the room can influence sensory perception — green reinforces the impression of acid, blue that of bitterness, and red that of "high quality."[2]

Whether the tasting is conducted standing up or sitting down will have certain effects on concentration and fatigue. Standing and moving around interfere with concentration, however fatigue can set in more quickly if the taster is sitting in one spot.

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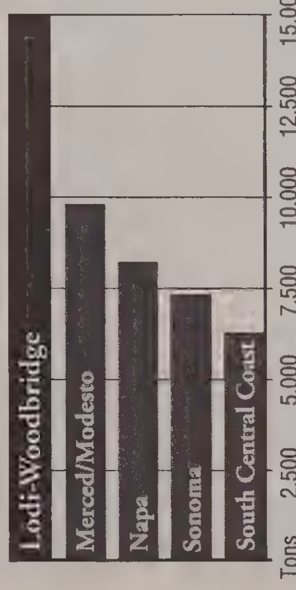

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Even for straightforward production tastings, the relatively common practice of tasting at the lab bench has several drawbacks. It is difficult to concentrate successfully due to numerous distractions. Interfering aromas and noises abound. It can be more difficult to conceal the identity of samples in the room where they are prepared. And generally speaking, the process of tasting itself is taken less seriously when it is being conducted "on the side" of other activities.

In addition to enhancing concentration and minimizing interfering sensory factors, tasting facilities should reflect the appropriate seriousness of the process and the importance of the results. Terry Adams at Sonoma-Cutrer Vineyards observes that going into the tasting room and closing the door defines a kind of ritual which promotes serious work.

All of this is not to say that all tasting must occur in a totally secluded, silent, light gray room at 18° C, with fresh air replaced 10 times every hour and daylight-simulating lights.

As with all other parts of a tasting program, the details depend on a balance between objectives and logistics. However, the reliability of the results from any tasting increase with improved tasting conditions.

Then again depending on the goal, tasting in the cellar itself might be of interest. When taking visitors into the winery, the atmosphere as described by P. Poupon could be *advantageous.* "There is an abundance of vinous odors in a cellar and such an optimistic atmosphere that you find yourself in an olfactory context where impressions are easily distorted."[3] This optimism might prove advantageous for image; however, it is not conducive to careful sensory evaluation.

"Who" — Tasters

Tasters can be expert or non-expert, trained or untrained. Depending on the objective, any one (and often a combination) of these kinds of individuals might be useful. As usual, logistics figure into the final result. In reality, the tasting panel might simply depend on who is readily available and motivated and how much of an investment of winery time is practical.

"Expert tasters" are individuals who are professionals in the field such as winemakers. "Trained tasters" in this context refers to individuals who have recently gone through a training program often specific to the characteristics in question.

Three types of tasting "attitudes" are discussed in sensory evaluation literature: objective, subjective, and affective. To observe that a characteristic (such as sweetness) is present in a wine is objective. To evaluate relative degrees of sweetness is also objective.

There are varying delineations between what is considered subjective and what is affective attitude. At times they are used interchangeably. Assigning preferences or quality assessments are generally referred to as tasting with a subjective or affective attitude. To state that a wine is too

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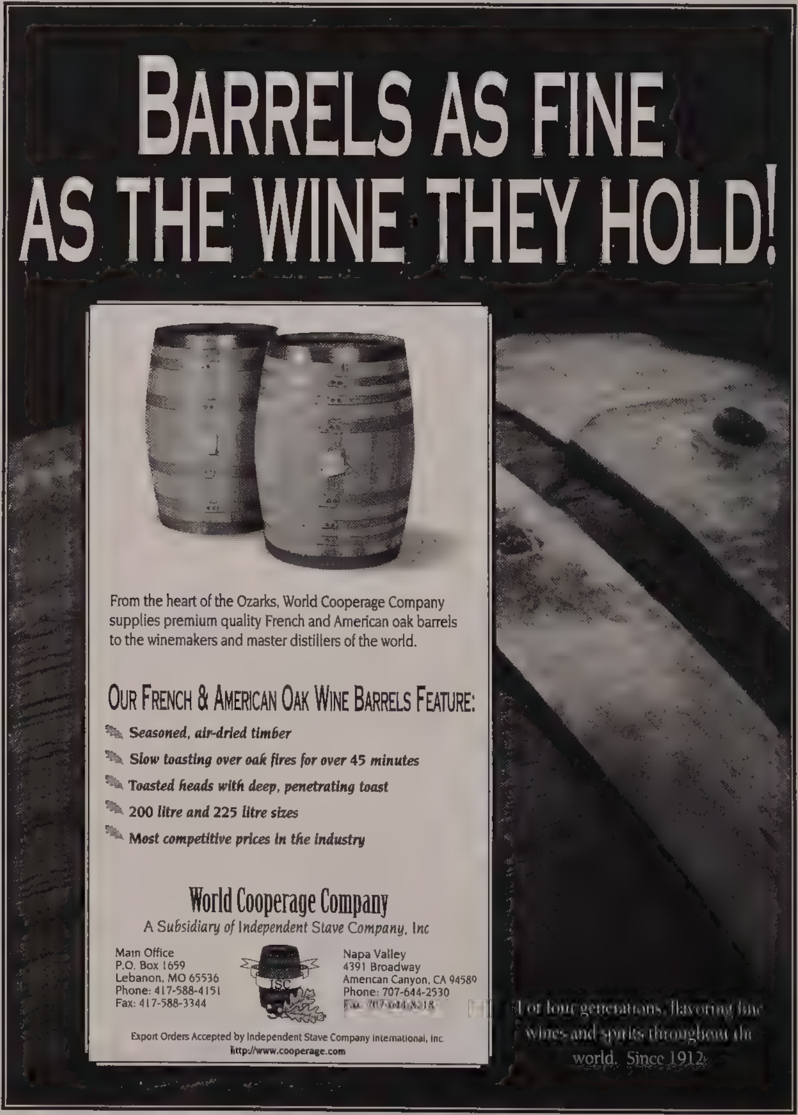

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sweet, or too dry, or that all sweet wines are unpleasant are subjective or affective assessments. Here we will use only the terms objective and subjective for the sake of simplicity.

The question of tasting *attitude* (objective vs. subjective) is important in deciding the most appropriate functions for the tasters. Sensory evaluation methods and techniques promote objective tasting. However, subjective judgments *can* be applied in sensory evaluation projects, particularly in consumer or market testing. Additionally, the subjective judgments regarding style and quality made by the expert tasters, will normally be integrated in one way or another into most sensory evaluation projects in a winery.

For difference testing

If the purpose of tasting is to determine whether or not differences in production or experimental trials exist, repetition and reproducibility are critical. An objective attitude on the part of the tasters is essential. Also in this case, a larger number of tasters is desirable. It's important that they be trained, but it is not necessary that they be expert tasters.

Although most wineries won't develop programs as extensive as that at Beringer, simpler development and use of auxiliary tasting panels are possible. Simi Winery (Healdsburg, CA) has a tasting panel of 12 individuals from several departments. The panel's function is to determine differences and indicate preferences between various production trials. In this case, both objective and subjective tasting are involved.

These tasters annually attend several training sessions that involve taste, aroma, and flavor identification and exposure to a range of tasting formats. They then participate in 30 to 35 tastings of production and experimental trials.

Though panel members are not screened for specific sensitivities, they are selected by general ability, interest, proximity, and motivation. At each tasting, members are rewarded for their efforts with cookies and candy. Anyone working with such volunteer tasting panels stresses the importance of such rewards in promoting motivation and morale.

Consequently, Simi staff evaluates its trials in a more meaningful way due to having a larger number of trained tasters. And this is accomplished with a reasonable investment of resources.

For descriptive assessment

Language development for descriptive tasting can also require both objectivity and subjectivity. When a tasting project's goal is to obtain the appropriate fruit from the vineyard, the first step is to develop a vocabulary in common with the grower. In this case, the tasters should be selected based on their respective roles and responsibilities.

Murphy-Goode Estate Winery (Geyserville, CA) conducted such a project. The objective was to characterize wines from specific vineyard blocks with different harvest histories in order to develop harvest criteria for the winery's reserve program. The tasters were the vineyard manager, the winemaker, key production personnel, and a consultant. The tasters were essentially "expert tasters." There was no formal training involved, but tasting resources such as the ASEV Wine Aroma Wheel[4] and lists of descriptive terminology were available for reference.

The subjective selection of which lots were most desirable for the reserve program was made by the winemaking staff. Then the group generated commonly understood terminology for the particular characteristics found in these selected lots. In order to identify and formalize this terminology, the expert tasters had to taste objectively but with subjective issues in mind.

Training and maintaining tasting panels

Peynaud states that, when the expert taster is required to taste subjectively, normally "he is not being asked whether such and such a wine pleases him, his job is to examine, describe, and assess its positive or negative tasting qualities and to base his conclusions on what he finds."

Having a larger tasting "pool" is very useful — and it's members should be actively tasting. From time to time any taster is not "fit," due to illness or other distractions. Sometimes the winemaker is too close to a project to be sufficiently objective.

Because of the differences in individual thresholds for various compounds, any individual can have "blind spots."

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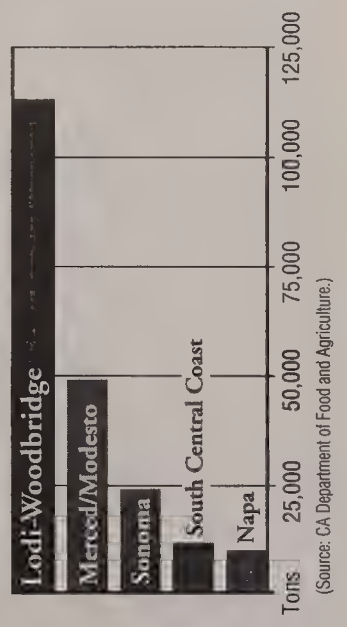

(Source: CA Department of Food and Agriculture.)

It has been established that approximately one-third of the population has a low sensitivity for bitterness, logically as many as one-third of all winemakers are not particularly sensitive to bitterness.[5]

Inversely, two-thirds of consumers have normal sensitivity to bitterness. Consequently, a winemaker might need an auxiliary palate with a high sensitivity to bitterness to avoid releasing an unnecessarily bitter wine to that consumer population. There are numerous other characteristics besides bitterness that might fit this scenario.

For reasons such as these, it's desirable for a winemaker to have the resource of auxiliary "expert" tasters for back up — individuals who are knowledgeable in sensory evaluation and wine style.

On the other hand, non-experts, even untrained, can contribute, too. When the goal is a two-way communication with the market, having significant numbers of consumers tasting subjectively can be critical. With some careful thought put into tasting design, and even short of a professionally-designed consumer testing project, visitors to the tasting room can generate very interesting information.

Improved communication and relations within the organization are also important advantages to involving additional staff in tasting. Often wineries have weekly or monthly staff tastings. Normally, the tasters evaluate the wines subjectively — selecting preferences in blind tastings. This can provide some very helpful input. It can even provide the unsung advantage of reinforcing the "house palate" — which at its ***best*** can serve to reinforce style. But of particular significance, these tastings provide a means to involve and educate more staff in the wine production process and serve an important team-building function.

Finally, providing staff with sensory evaluation tools contributes to expanded resources within the organization, to greater job satisfaction, understanding, and appreciation of wine and the winemaking process (and consequently to improved job performance).

Methods and interpretation of results will be discussed in the next **PWV**, addressing some of the "what, when, and how" questions of a sensory evaluation program.

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SOIL MOISTURE

Deficit irrigation in theory and practice

by Michael Porter

Water management in premium winegrape vineyards challenges vineyard managers. How much water does a grapevine need? What's the best strategy for controlling vine water status? How does irrigation affect wine quality? Even the definitions of basic terminology can be confusing.

Growers are faced with making irrigation decisions in real vineyards without sufficient site-specific information. Water use data is publicly available from CIMIS (California Irrigation Management Information System). The CIMIS computer models are a more recent application of decades of related work with a variety of crops by H. Penman, C. Thornthwait, C. van Bavel, J. Monteith, N. Rosenberg, M. Jensen, and H. Haise. The sub-model on which the CIMIS model for winegrapes is based uses data from irrigated desert commodity grapes. Crop coefficients attempt to adjust CIMIS values, but don't go far enough. See Tables I and II for a comparison.

When determining water needs for grapes in a different climate with different soils, with different scions, and most important, a different end product (fine wine vs. raisins), any proposed model needs to be derived from scratch. When a scaled back version of the water needs of a similar crop are used instead, confusion results.

This report attempts to clarify some of the terminology, compare real water use with theoretical values, and review some of the strategies appropriate to moderate climate regions such as the North Coast, Central Coast, and higher elevation Sierra foothills in California. Some growers may consider using this information to set up field trials in their vineyards and assess the subsequent impact on finished wine.

The discussion deals primarily with relatively shallow (two to four feet) soils, most of which require some irrigation to produce a viable crop.* Actual rates or quantities of water used in these vineyards are based on readings taken with a neutron probe which was calibrated against several hundred gravimetric samples. Of the nine sites listed in Table II and III, two are sandy loam, three are loam, two clay loam, and two clay.

Table I:
Water use, in inches per season[1]

Area	Predicted full	Predicted sufficient	Author's measurements
Fresno	25	18	
Lodi	27	19	
Healdsburg	25	17	6 to 8
Oakville	23	16	6 to 8
Carneros	19	13	3 to 5
Santa Maria	19	13	
San Luis Obispo	22	15	
Temecula	23	16	

[1] Data in Table I includes soil reserve and rainfall plus irrigation (Prichard's and author's data) and is based on 8 X 12 spacing on AXR-1 rootstock (author's data).

What is "stress?"

To hot-climate growers of table grapes, stress is anything less than vigorous, lush, green growth. Many trials done in the San Joaquin and southern desert valleys have shown that yield is maximized under these conditions. (Most winegrape growers recognize that such an approach results in poor quality winegrapes.)

Table grape growers produce large, soft, thin-skinned, juicy berries by keeping vines in vegetative growth throughout most of the growing season. In a desert environment, this requires frequent irrigation (and nitrogen additions). High-vigor desert viticulture defines the high end of water use.

What winemakers want, however, are small, tough, thick-skinned berries. This is achieved by keeping vegetative growth under control. To an eye calibrated for high-vigor vines, this is vine stress. To a low-vigor, wine-quality-oriented eye, this is vine balance.** Thus, much confusion has resulted from having desert commodity viticulturists advising coastal winegrape growers on irrigation.

What is "deficit irrigation?"

Growing lush, Amazon-jungle vines in a desert clearly requires a great deal of irrigation. Conceptual models of vine water use (and computer simulations based on them, *e.g.*, CIMIS) have been discussed in California for more than 20 years.

These models were adjusted to fit California's standard grapevine: irrigated, desert commodity grapes. As a result, subsequent computer models have historically been biased toward high-vigor vines at the high end of water use. Anything less than this theoretical very high rate of use is considered deficit irrigation — the grower is giving the vines less than the full amount that they can use for high-vigor growth.

The ultimate deficit irrigation is non-irrigation, which is common in mild climates, provided that there is adequate rainfall and rooting depth. Shallow soils in a mild climate may have an inadequate soil moisture reserve, so often some irrigation is needed to get through

---

*For an overview of moderate-climate water management, readers are invited to review "Water management in California's North Coast" in **PWV** March/April 1995. Examples used there and here are from commercially-managed vineyards in Sonoma and Napa counties. The 1995 article covered a wider range of soil depths, including a number of non-irrigated sites.

For more on the interaction between wine quality and vigor, see Richard Smart's book *Sunlight Into Wine* and his column in **PWV, and the *ASEV Journal*.

Table II: Total water use, inches per season[1]

Site	Root depth	1989	1990	1991	1992	1993	1994	1995	Avg
A - Carneros	3'	1.84	2.85	2.77	2.80	2.60	2.98	2.75	2.66
B - Carneros	5'	2.60	2.55	2.92	3.04	3.12	2.44	2.87	2.79
C - St. Helena	4'	3.57	3.27	3.39	4.08	3.74	3.86	4.40	3.76
D - Silverado	2'	4.64	4.38	4.50	4.49	4.77	4.43	5.27	4.64
E - Russian River	3'	6.07	5.93	5.56	4.56	5.64	4.86	6.65	5.61
F - Healdsburg	3'	5.44	6.08	6.23	6.38	6.17	5.30	5.76	5.91
G - Kenwood	3'	7.45	6.26	6.60	7.27	7.55	7.36	7.47	7.14
H - Yountville	3'	7.66	7.80	7.85	8.00	7.91	7.41	8.05	7.81
I - Geyserville	4'	7.60	8.72	7.35	9.90	8.16	7.39	8.82	8.28

Table III: Site and wine factors

Site	Irrigation	Crop load	Vigor	K/Mg status	Wine style	Market niche
A - Carneros	none	avg	avg	avg	rich	$$$
B - Carneros	none	avg	avg	avg	rich	$$$
C - St. Helena	drip	avg	avg	avg	medium	$
D - Silverado	drip	avg	avg	high	rich	$$$
E - Russian River	drip	avg	avg	high	medium	$$
F - Healdsburg	drip	avg	avg+	high	rich	$$$
G - Kenwood	drip	high	high	high	medium	$$
H - Yountville	sprinkler	avg	avg	low	light	$
I - Geyserville	sprinkler	low	low	low	light	$

[1] The first readings were taken in the spring (April or May) when the total moisture content of the soil profile was at its highest level of the season, reflecting spring rain. All sites were measured weekly. The last readings are after harvest (usually late September, or in October, depending on the block). All are spaced 8 X 12 and are (believed to be) on AXR-1 rootstock.

a season. It turns out that this irrigation requirement is far less than the conceptual models for vine water use predicted, making so-called deficit irrigation the only reasonable option for winegrape balance and quality.

Reference ET

Computer simulation of water use is based on the concept that plant transpiration is primarily driven by sunlight interception by the leaves, with adjustment for air temperature, humidity, and so on. The CIMIS group studied irrigated pasture and alfalfa in a wide range of California climates. In each climate, water use for other crops is recommended based on a reference to the CIMIS results for pasture and alfalfa. The CIMIS reference point is called "reference ET (evapotranspiration)."

Grass and alfalfa give a continuous light-absorbing surface for maximum heat generation, hence maximum evapotranspiration, making them perfect for computer simulation studies. In the computer model, adjustment of water use is based on how much sunlight hits the leaves versus the ground.

For grapes, the CIMIS sub-model was first applied to desert commodity grapes. Had the model been adapted to low-vigor winegrape vines first, the predicted rates of water use would be lower. Had the model been adapted to mild-climate fine-wine viticulture, the rates would be lower still. Instead of starting from scratch — which one should do when moving a conceptual model from a desert-commodity, high-vigor environment to a mild-climate, premium-wine, low-vigor domaine — it has been assumed by many people that the model is correct for most, if not all California grapes.

Water use predictions

Table I shows some predictions of water use for grapevines in various parts of California as calculated by the "full" CIMIS grape sub-model and reduced by 30% using Terry Prichard's "sufficient" criteria, as well as a few measured ranges based on calibrated neutron probe readings in many vineyards over more than a decade.

After consulting with colleagues in the San Joaquin Valley and analyzing neutron probe data, I find the 18 (to 25, if heavily irrigated) inches of water use for Fresno to be quite believable. Please note, however, that the CIMIS model predicts more water use for Lodi than Fresno. Growers familiar with the two areas find this to be in error, believing intuitively that the transpirational demand near Fresno must be higher, and neutron probe data supports this view. The basic model relies heavily on sunlight interception. Lodi is north of Fresno, so Lodi has longer days, hence more sunlight. The model overestimates the effect of sunlight and underestimates the influence of temperature, humidity, and low-vigor management. This may be seen by comparing the observed and predicted North Coast values.

Actual water use in the North Coast is half (or less) of the "sufficient" values and a third (or less) of theoretical "full" use. Note also that the CIMIS and Prichard's models show comparable water use for Healdsburg and Fresno, with Oakville a little less, and Carneros a little lower yet. Intuitively we know that this is too high, and years of actual

Table IV: Relative seasonal conditions

Year	Previous winter rainfall	General season weather
1989	avg–	cool spring warm summer
1990	avg–	warm spring mild summer
1991	avg–	mild spring mild summer
1992	avg–	warm spring mild summer
1993	high	wet spring hot summer
1994	avg–	mild spring mild summer
1995	very high	wet spring hot summer

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measurements confirm it.

Water use in the North Coast is very different from what the numerical models predict. This is not unique to ET models but is a general problem associated with most computer simulations, especially of biological systems.***

Consider a 1994 trial in Carneros. Various rates of water were applied, with "full" CIMIS as a starting point, where the crop coefficient (Kc) is one "that will maintain soil water content approximately constant." (Table grape technology — in Carneros.) Rates as low as 1/4 of the "full" CIMIS rate were tried. Unfortunately omitted were non-irrigation and early deficit irrigation, both of which are common in Carneros. It is interesting to note that irrigation started in May; that may be the proper time to start in Kern County, but not in Carneros.

By starting with a high-vigor desert commodity grape model, one will naturally predict high rates of water use. No doubt a low-vigor coastal wine grape model would underestimate optimum San Joaquin water needs. Researchers have begun to look at "reduced" irrigation and wine quality in the mild climates of the Central and South coasts. They may well discover that "reduced" means "normal" and "reasonable."

Mild summer temperatures near Santa Maria, for example, should result in a very modest transpirational demand, as seen in Carneros. Once sufficient empirical data is available, anyone attempting to develop an ET model for Santa Maria (or any other distinct climate zone), can use it rather than simply adopting the old base model with plans to make some scale adjustments.

***For a thorough discussion of the limits inherent in such models see the article on this subject in the Feb.4, 1994, issue of *Science* (the foremost peer-reviewed scientific journal in the U.S.) by Naomi Oreskes et al., (page 641). The abstract states succinctly:

"Verification and validation of numerical models of natural systems is impossible. This is because natural systems are never closed and because model results are always non-unique. Models can be confirmed by the demonstration of agreement between observation and prediction, but confirmation is inherently partial. Complete confirmation is logically precluded by the fallacy of affirming the consequent and by incomplete access to natural phenomena. Models can only be evaluated in relative terms, and their predictive value is always open to question. The primary value of models is heuristic."

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Developing irrigation strategies

One goal of ET-modeling, soil moisture monitoring, canopy observation, and other water management strategies is to account and compensate for variations from one season to the next in hopes of refining one's irrigation to produce the highest quality wine. Table II illustrates some of this variation in nine North Coast vineyards over seven years, showing total water use (soil reserve reduction plus irrigation) in inches per season. All are on shallow soils, so deep root uptake isn't a factor — what you see is what the vines used.

Some seasonal effects seem apparent. For example, most vines used more than average in 1995, possibly due to hot summer weather in association with poor potassium uptake from very wet soil ("spring fever"). Many used less than average in 1994, owing possibly to the mild season, and use was average or above in 1993. Some of the variation may be due simply to higher rainfall in 1993 and 1995 than 1994, so that there was more moisture in the topsoil to evaporate early in the season. (see Table IV).

Other variables include: crop load per vine (as influenced by pruning, set at bloom time, and thinning), management of weeds or cover crop, fertilization, canopy management, rootstock, planting density, scion and clone, and especially desired wine style/niche (see Table III). When all of the potential variables are considered, the task of coming up with an accurate computer model is daunting indeed.

Deficit strategies

Various experiments have manipulated irrigation to try to determine the strategy that produces the best wine. Results from one trial may not apply in another trial or in your vineyard. Rather than adopting someone else's optimum approach, the best place to do trials is in your vineyard. Even so, a few generalizations may be possible, related to irrigation deficits in some circumstances.

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irrigated, "dry farmed" vines. This is a common practice in deep soils (six feet or more) with deep root systems in the North Coast, higher elevation Sierra foothills, and other Mediter-ranean climate regions with sufficient rainfall to refill soil in the winter. The vines have adequate soil reserve to go through a season without supplementation, as they are self-regulating, and use less water than many people think.

Early deficit irrigation refers to a regime of withholding irrigation early in the season, while the vines extract stored soil moisture, then supplementing a dwindling soil reserve later in the year with irrigation. This is a common approach for shallow soils in the North Coast and in lower rainfall years and areas such as the Central and South coasts.

Vines in shallow soils with modest soil moisture reserves often grow well enough in the spring that no intervention is needed until well into the season. This is one way to ensure vine vigor is controlled — vines will stop shoot growth due to lack of water long before photosynthesis is reduced.

Though some simple formulas do exist for deciding when to start irrigating and how much and how often to do it, they ignore some site- and season-specific aspects that are better determined than assumed. As before, the place to do trials is in your vineyard, then make wine from the grapes and see what results!

Late deficit irrigation supplies supplemental water early in the season, then reduces or eliminates it at some point (often at veraison). The early application tends to stimulate vigor and condition the vines to an artificially-high rate of water use. On deep soils in the North Coast, and similar climates, this imposed vigor often leads to unnecessary canopy management expense, and can result in larger berries because it stimulates cell division post-set. On shallow soils and low rainfall sites, late deficit irrigation results in severe late-season soil and vine

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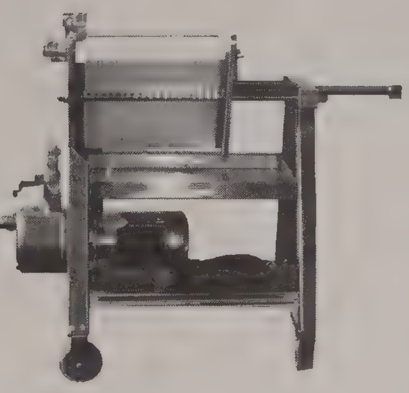

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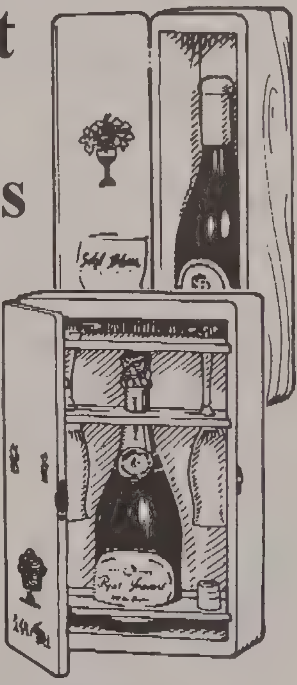

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water deficit, defoliation, and fruit desiccation. Ripening by dehydration is generally viewed as one way *not* to make premium wines.

Leaf temperature

Some efforts have been made to use leaf temperature as an indicator of plant moisture status to aid in irrigation management by studying the interaction of soil moisture, leaf temperature, air temperature, humidity, and sunlight. The Crop Water Stress Index (CWSI), for example, assumes that elevated leaf temperature is due to lack of soil moisture. Use of the word "crop" causes some fine-wine growers to be cautious, as this is reminiscent of the historical equating of desert commodity grapes with premium wine grapes. More important, the assumption that elevated leaf temperature is caused by "water stress" and requires irrigation is not supported by research. Unfortunately, there are confounding factors such as mites, potassium deficiency, phylloxera, and so on, which can also lead to warmer-than-normal leaves.

Some replicated trials have shown a statistical correlation between CWSI and available soil moisture, with a trend toward higher CWSI values with decreasing soil moisture — but the variation in the data can be substantial. Vines with modest available soil moisture can yield CWSI values ranging from 0 (no stress) clear up to 7 (very high stress).

There's more happening than just lack of soil moisture. A statistical correlation is simply not good enough. Perhaps it should be called the Leaf Temperature Anomaly Index (LTAI) to encourage people to consider all possible reasons for the leaves to be too warm, rather than coercing them to assume that it is due to low soil moisture.

Summary

Old evapotranspiration models are just that — old and outdated. We know better. No irrigation regime is universal, whether it's ET or not. How much your Uncle Charlie irrigates his raisin-grapes in Bakersfield isn't relevant to you. Even the irrigation needs of your neighbor's valley vineyard have little bearing on the irrigation requirements of your hillside vineyard planted in soils that are three feet deep. Soil moisture is a powerful factor in producing grapes for fine wine, and it must be managed appropriately.

Appropriate management can only come from thought and experimentation in your vineyard, keeping in mind that a tendency toward little or no irrigation is often the best choice for premium wine grapes. ■

Michael Porter worked as a winemaking assistant and as a research assistant at Crocker Nuclear Lab, UC Davis, while studying physics at Cal State University-Chico. He earned a masters degree in earth sciences from Chico. He has taught geology, meteorology, oceanography, physics, and astronomy in junior colleges. Since 1984, he has worked with Bob Uttermohlen to provide soil fertility, vine nutrition, and water management consulting services.

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PWV SUPPLIERS SHOWCASE

PACKAGING

Bottles ▲ Corks ▲ Labels ▲ Capsules ▲ Shippers

PACKAGING PARADE

The following information describes the bottles in our three-photo lineup, beginning with the bottles below, left to right, and the opposite page above, left to right (also on the cover). Letter codes at the end of each paragraph direct you to the bottles' top dressing in the photo on the opposite page below.

MESSINA HOF WINE CELLARS
Antique green, Burgundy bottle with flange top by **Vitro Glass Co.** Label by **Insight Printing**. Cork by **Primo Packaging.** Grape-cluster/leaf printed (stock) B-Cap® by **Wine Cap Co.** **E**

TERRA D'ORO by MONTEVINA
Package design by **Michael Osborne Design**. Antique green, Bellissima II 750ml bottle by **California Glass Co.** Two-color ACL decoration by **Phoenix Decorating**. Cork by **fp Portocork**. Three-color neckband by **fp Label Co.** Embossed and painted tin capsule by **Ramondin USA**. **A**

ROUND HILL
Metalized die-cut paper label with U.V. coating by **fp Label Co.** Embossed and painted tin capsule by **Ramondin USA.** **L**

ROUND CORNERS
Bottle decoration by **Ceramic Decorating**. Synthetic silver closure by **SupremeCorq.™** **D**

C.K. MONDAVI
Package design by **Jeffrey Caldewey Design**. Dead-leaf green, push-up Burgundy bottle with bar-top finish by **Anchor Glass Container**. Twin-disc agglomerated cork. Label by **Gordon Graphics**. Clear PVC capsule with embossed top disc (printed 2-color) by **Maverick Enterprises Inc.** **I**

WENTE VINEYARDS
Package design by **Michael Osborne Design**. Bottle by **Demptos/Vitro**. Label and neckband by **Louis Roesch Co**. Cork by **Trierische Kork-Industrie**. Wax-Lock™ by **Pro Pack Systems, Inc.** **C**

PONZI VINEYARDS
Synthetic black closure by **SupremeCorq™**. Custom B-Cap® by **Wine Cap Co.** **B**

EXPRESSIONS by GLEN ELLEN
Package design by **Colonna Farrel Design Consultants.** 375ml antique green, Styria push-up bottle with bar-top finish by **APM, Inc.** Four-color and heavy embossed die-cut upper face label, foil-stamped/embossed lower strip label, foil-stamped/die-cut neck band by **fp Label Co.** Cork by **APM, Inc.** Custom, pre-formed, debossed Wax-Cap™ disc by **Wine Cap Co.** **G**

CANYON ROAD
Champagne green, flange claret push-up bottle by **Owens-Brockway Glass.** Label by **Gordon Graphics**. Cork by **fp Portocork**. Neck band by **Cameo Crafts Graphic Industries Ltd.** Clear PVC capsule with embossed top disc (printed 2-color) by **Maverick Enterprises Inc.** **J**

GRYPHON GLEN WINERY
Die-cut, pressure-sensitive label by **McCoy Label.**

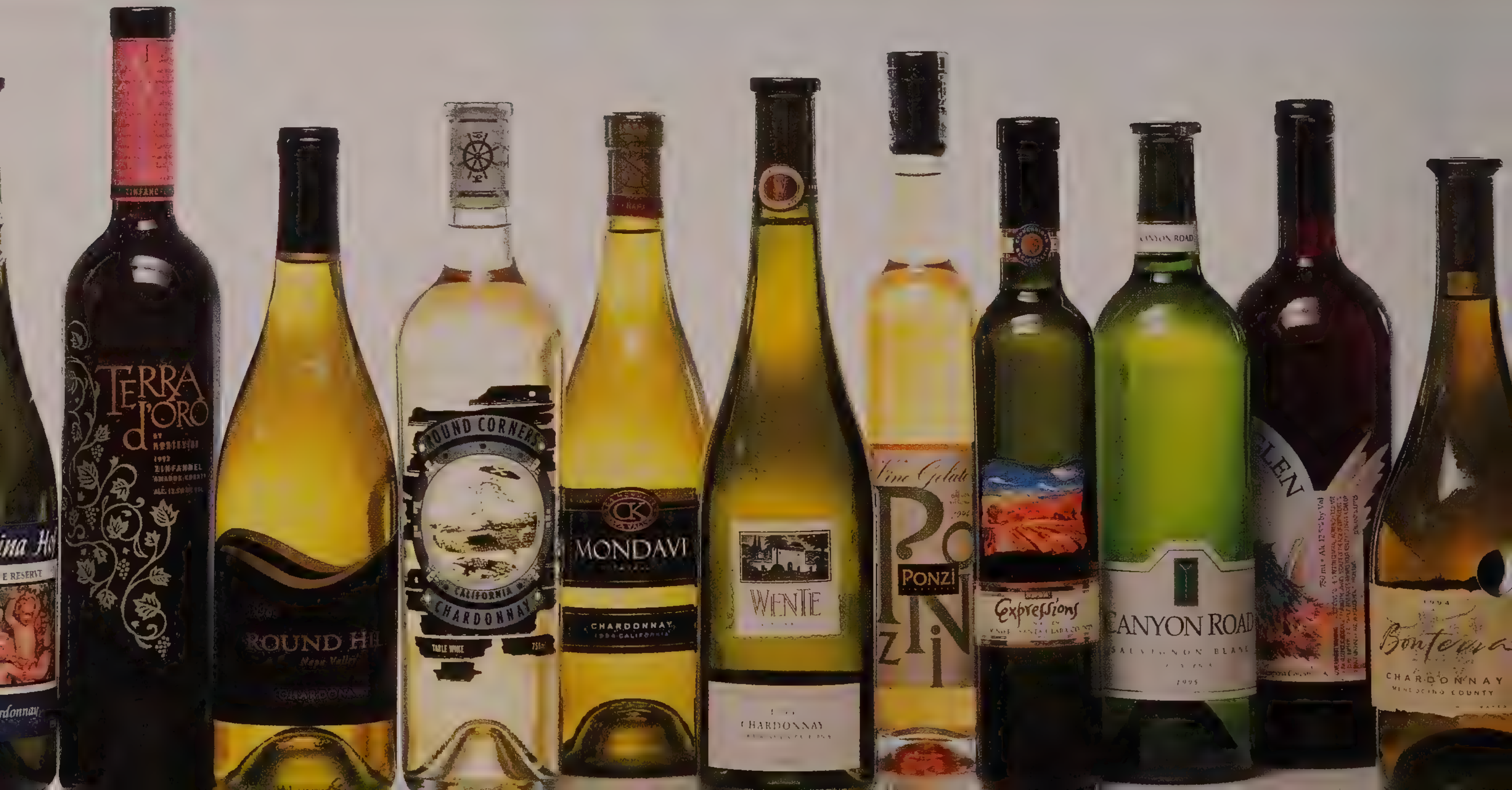
BONTERRA by FETZER
Proprietary-mold, antique green, flange-neck bottle (push-up contains embossed grape leaf) with 40% recycled (25% post-consumer) content by **Anchor Glass Container**. Seven-color label on tree-free kenaf, die-cut deckle-edge finish, embossed and debossed by **Bolling & Finke Ltd.** Wax-Lock™ by **Pro Pack Systems, Inc.** **F**

ON COVER:

CHATEAU SOUVERAIN
Proprietary push-up, dead-leaf green, Burgundy bottle with 16-faceted shoulder and heel with smooth label panel and bar-top finish by **Ball-Foster Glass.** Cork printed with wraparound winery/vineyard image by **Calcork**. Eight-color, foil-stamped, bronzed label by **fp Label Co.** Clear PVC capsule with green and gold foil neckband and green and gold foil disk by **Savoye Packaging**. **H**

PELLEGRINI VINEYARDS
Three-color plus foil, pressure-sensitive label by **Tapp Technologies Inc.**

VICHON WINERY
Package design by **Chuck House.** Flint, straight-sided, claret, push-up bottle with 35mm wide Mondavi-flange finish by **Ball Foster/Madera Glass.** Label and neckband by **Herdell Printing.** Cork by **Italcork.** Cork label by **MPI Label Systems, Inc.** **K**



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fp PACKAGING, INC.

Offering a full range of packaging supplies and equipment, fp Packaging represents a comprehensive selection of capsule styles and materials.

Sofacap's innovative seamless extruded capsules are composed of an extruded PVC top disc thermo-welded to a seamless body, assuring the integrity of the finished capsule while providing the look of traditional tin/lead capsules.

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Prominent producer, Oller, is fp's manufacturer of high quality Champagne corks and agglomerated corks with natural ends for still wines.

fp Packaging also represents the Bertolaso and Cobert lines of filling and corking/capping equipment, as well as Robino & Galandrino and Cavagnino & Gatti, which offer innovative systems to meet specialized packaging needs. Robino & Galandrino's extremely flexible monobloc machines can dispense and apply metal or PVC capsules or both metal and plastic in one machine.

Robino & Galandrino's new generation spinning heads are the first major advancement in metal foil application in decades; the new heads provide higher efficiency and improved appearance, particularly with poly-laminate capsules.

Cavagnino & Gatti's rotary labelers are available in both wet-glue and pressure-sensitive versions. Special configurations offer both capabilities in a single machine.

For more information, contact:
fp Packaging, Inc.
601 Airpark Rd., Napa, CA 94558
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Please see our ad p. 49.

ENOTECH CORP.

Enotech supplies heat-shrink, poly-laminated aluminum, and tin capsules, as well as sparkling wine capsules and long-skirted ROPP screw caps. Capsule tops may be embossed or printed. Custom decoration in multiple colors is available for all products. For easy opening, heat-shrink capsules can be furnished with optional tear tabs in various colors.

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Enotech Corp.
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Lafitte Cork Portugal, as a part of Lafitte Industries, ships corks to wineries in France, Spain, Argentina, Chile, and Australia. With a world-wide market, Lafitte continues to invest in personnel and technology to maintain its position as a world-wide supplier.

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For more information, contact:
Lafitte Cork & Capsule, Inc.
45 Executive Court, Napa, CA 94558
tel: 800/343-2675; fax: 707/258-0558
Please see our ad pgs. 20, 45.

ROCK-TENN CO.

The Partition Division of Rock-Tenn Company is one of North America's leading manufacturers of solid fiber partitions. Solid fiber partitions provide unparalleled product protection, with the advantages of cleanliness, reduced label scuffing, reduced case size, and compatibility with automatic filling equipment.

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Rock-Tenn's commitment to maintaining its leadership is time-tested, spearheaded by a research and development team of industry-leading designers and engineers.

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For more information, contact:
Woody Thompson
Rock-Tenn, Partition Division
504 Thrasher St., Norcross, GA 30071
tel: 800/558-6984; fax: 770/368-7651
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ITALCORK, INC.

Italcork is an exclusive distributor of premium Sardinian cork. Sardinia's thin, rocky soil results in cork that is inherently more dense than its competitors. Italcork's exclusive manufacturer (and partner), Sugherificio Ganau, is the largest producer of Sardinian cork on the island, one of the only vertically integrated cork producers in the world, and an industry leader in cleansing and manufacturing techniques. Ganau still lets the bark "age" for 18 to 24 months before processing, boils the bark twice instead of once, and cuts the strips by hand, allowing cutters to bypass any defects in the cork strip.

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For more information, contact:
Mark Coleman, Italcork, Inc.
21707 8th St., #16, Sonoma, CA 95476
tel: 707/939-1774; fax: 707/938-8326

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13950-A Cerritos Corporate Dr.
Cerritos, CA 90703
tel: 310/802-7769; fax: 310/802-1030

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FASSON ROLL DIV.

Fasson's family of pressure-sensitive wine labeling materials is designed to present wine in the most appealing manner while increasing the ease and efficiency of bottling and labeling operations.

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SABATÉ USA

For over five generations, the Sabaté family has harvested only the highest quality cork from the forests of southern Europe. Dedicated to the manufacture of the finest corks, the company is proud of its many industry firsts — from its widely adopted peroxide washing process to the superior Altec® cork.

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tel: 415/922-9066; fax: 415/922-9082
or distributor:
Pechiney Cork & Seal of California
5425 Napa-Vallejo Hwy,
American Canyon, CA 95489
tel: 707/257-6481; fax: 707/257-8028.

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THE WINE CAP CO.

The Wine Cap Company sells and distributes the B-Cap™ and the newly released Wax-Cap™ closure systems. The Wax-Cap is a pre-formed, embossed wax disc that is applied on top of a recessed cork. Like the B-Cap, the Wax-Cap corkseal completely eliminates the difficulty and frustration of removing tin/aluminum and plastic capsules. Unlike the plastic and metal capsules, the Wax-Cap is completely biodegradable.

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For more information, contact:

The Wine Cap Company
101 East Napa St., # 2, Sonoma, CA, 95476
tel: 707/935-4477; fax: 707/935-9500

Please see our ad p. 19.

ENCORE!

Although Encore! historically has been known as the wine industry's bottle washer and glass recycler, recent years have seen most of the company's growth occur in two related areas: addition of innovative wine bottle styles, colors, and shapes and development of environmentally friendly wine bottle shipping materials.

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In addition to blue and antique green colors, Encore! now offers tall tapered claret (Premier) in three colors, as well as a wide selection of flange and bar top bottles.

In May 1996, Encore! added a 3-, 6-, 12-pack, molded fiber, 750ml wine shipper to its existing 2-, 4-, 6-, 12-pack A.R.M. shipper. Together, these shippers — made entirely from post-consumer newspapers and approved for safe transit by all carriers — represent a range of economically attractive alternatives to Styrofoam shippers.

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For more information, contact:

Encore!
860 S. 19th St., Richmond, CA 94804
tel: 510/234-5670; fax: 510/234-0433

Please see our ad p. 18.

M.P.I. LABEL SYSTEMS

This Vichon cork decoration was printed by M.P.I. Label Systems in its Stockton, CA, plant on a nine-color flexographic press using six colors and varnish with a 150-line screen. M.P.I. is an industry leader in label quality, having won 27 industry awards for quality and/or technical achievement since 1989.

The "DecoCap" is a ten-point foil and paper laminate with a thin film to prevent staining or curling from moisture absorption. This non-adhesive version is supplied as die-cut caps on a continuous roll for automatic dispensing using a machine provided by M.P.I. The cap is held in place with a small spot of hot-melt adhesive. Efforts to remove the cork will dislodge and damage the cap. Once its seal is broken, it cannot be reattached as a wax cap could.

Wineries can also choose M.P.I.'s DecoCap self-adhesive version, which can be applied by hand or machine. It uses the same FDA-accepted adhesive used on fresh fruit labels. With a 30-year history serving clients from seven U.S. locations, M.P.I. is "The Customer Committed Company."

M.P.I. Label Systems, Inc.
2315 Station Dr., Stockton, CA 95215
tel: 800/533-2076; fax: 209/467-2469

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Calistoga Press offers a full range of printing services to the wine industry: in-house preparatory, printing, foil stamping, embossing, die cutting, and coating are offered, along with local services for design art, typesetting, and even pressure-sensitive labels on rolls.

Service is the name of the game in the wine label business, and no one understands that better than the professional printers at Calistoga Press. The staff of 10 has a combined 95 years experience producing wine labels and over 160 years in the printing industry.

Calistoga Press knows what you want and when you need it. Nobody in the business has a better "on time" record.

For more information, contact:

Calistoga Press
1401 Tubbs Lane, Calistoga, CA 94515
tel: 707/942-6033; fax: 707/942-5711

Please see our ad p. 64.

INDEPENDENCE BOX CO.

You can increase your profits with wood. Independence Box Company can help you boost sales on your special bottling or tasting room gifts. Showcasing your reserve bottling in a custom wooden half-case can add several dollars of value beyond the cost of the case itself. A gift package of wine alone or wine accompanied by other items packaged in wood will bring a higher price than all the items sold separately. Of course, no one will throw

away that box with your name on it. It will stay with them for years reminding them of the satisfaction they received from your wine.

Independence Box Company blends computer-aided design with traditional handcraftsmanship to provide a wide variety of gift boxes and crates, wine cases, and displays. The company also offers rustic branding or color foil stamping to make the boxes unique to your winery. Each design is to your custom specifications, and minimum quantities are small. Whether you need 50 boxes or 1,000, Independence Box Company is ready to help you add value to your wines and increase your profits.

For more information, contact:

Independence Box Company
935 North Main St., Independence, OR 97351
tel: 800/776-3763; fax: 503/838-3763

Please see our ad p. 47.

PICKERING WINERY SUPPLY

Pickering Winery Supply offers corks by Heinrich Gultig GmbH, which received the coveted ISO Norm 9002 certification in May 1995, not only for its processing facility and laboratory in Germany, but also for its sister companies in Portugal which do the manufacturing. Quality and accountability are the key words for Gultig corks.

New from Gultig is the E4, another non-chlorine cork which offers an integrated resin coating to guarantee the most neutral corks available.

In the area of capsules, through Pickering, VKN offers computer-generated colored paper sampling, which gives customers a spectrum of color and design possibilities to see before they request decorated samples. This service is offered for either the tin "Classic Caps," polylams, or the new "Polux" capsule, an individually decorated polylam capsule which features the design possibilities of tin capsules.

Stock tin capsules are available in bright red, a satin red, light gold bronze, brilliant gold, light shiny yellow, cream, and matte green.

For more information, contact:

Pickering Winery Supply
888 Post Street, San Francisco, CA 94109
tel: 415/474-1588; fax: 415/474-1617

Please see our ad p. 73.

fp PORTOCORK

fp Portocork has set the standard in the cork industry with its innovative non-chlorine NOVA cork. Its exclusive deep-cleansing high-pressure washing system creates a cork with lower polyphenols, thereby reducing the incidence of off-flavors.

In addition to NOVA corks, fp Portocork offers natural and traditional corks. In order to provide the finest corks available, fp has established a unique three-step approach to quality: incoming inspection on all lots, batch coding to provide complete traceability, and final inspection before shipment to guarantee that each order conforms to your specifications.

fp Portocork was the first company in the U.S. to include capillary and extraction tests on all shipments.

For more information, contact:

fp Portocork
601 Airpark Rd., Napa, CA 94558
tel: 707/258-3930; fax: 707/258-3935

Please see our ad p. 49.

RAMONDIN, USA, INC.

In response to the growing interest in non-standard bottle finishes, Ramondin is now producing short tin capsules which can be applied to some of the new modified flange bottles. These capsules solve the tamper-evidence problem with a traditional metallic closure, while allowing much of the cork to remain visible. A "cigar band" type neck label can also be placed further down to cover the base of the cork or the fill height. The capsules can be applied with standard capsuling equipment and can be painted and decorated in the same way as standard length capsules.

Ramondin USA's parent company, Ramondin, S.A., in Logrono, Spain, has received the coveted ISO 9001 certification for its quality control methods.

For more information, contact:

Ramondin USA, Inc.
830E Latour Court, Suite E,
PO Box 2266, Napa, CA 94558
tel: 707/944-2277; fax: 707/257-1408

Please see our ad p. 32.

BUTTITTA DESIGN

Laurel Glen Vineyard's fourth wine release, *REDS* is a rich blend of red wine varietals, deserving an equally rich label. Buttitta Design of Healdsburg, CA, created a collage illustration using layer upon layer of different colors of red to produce a surreal, romantic landscape, depicting the rich earth from which delicious red wine is born. The *REDS* packaging and poster have helped make it one of the year's most successful marketing programs in the wine industry.

Award-winning designs for *REDS* and the *Sonoma County Chef's Tasting* are just two of this year's highlights for Buttitta Design.

Smart thinking and innovative ideas characterize Buttitta Design's style and approach to creating successful marketing programs. "We believe 'packaging' is more than just a label on the bottle. Advertising and marketing materials are also part of the essential product packaging." Special attention to detail and careful time management of projects are Buttitta Design's hallmarks.

For more information, contact:

Buttitta Design
132 Matheson St., Healdsburg, CA 95448
tel: 707/431-1257; fax: 707/431-1507

Please see our ad p. 9.

CORK ASSOCIATES

Cork Associates is pleased with the enthusiastic acceptance of the BWC-PLUS cork for fine wines. BWC-PLUS uses the proven BWC technology which washes and sanitizes the cork without use of chlorine, and the PLUS offers a more natural-looking cork with neutral taste characteristics and excellent sealing abilities.

Cork Associates continues to offer natural (metabisulphite-washed) and traditional corks.

These corks are processed and screened by laboratory quality controls in the Cork Associates factory in Portugal. Upon arrival in California, the corks are finished and go through the quality controls of its laboratory in Napa. The company works to the high standards which are so important to the modern wine industry, and it is a founding member of the Cork Quality Council.

In addition, Cork Associates serves the needs of the sparkling wine industry in North America with "SPARK" brand corks of the highest quality. The SPARK factory also produces Twin-Top agglomerated corks with natural disc-ends which are leading a new trend in sealing still wines. Both the Spark and Twin-Top corks have discs which have gone through the patented Enos system to remove volatile components and leave the discs very neutral in taste.

Cork Associates is always studying new methods and innovations to keep natural cork products as the preferred closure for fine wines.

For more information, contact:
Cork Associates
902-M Enterprise Way, Napa, CA 94558
tel: 707/224-6000; fax: 707/224-7616

Please see our ad p. 19.

CALIFORNIA GLASS CO.

California Glass Company is uniquely situated to offer the wine industry the broadest variety of goods and services. Representing both Owens-Brockway Corporation and Madera Glass, the two largest domestic manufacturers of wine containers, California Glass provides the most comprehensive selection of domestic wine bottles available in the U.S. In addition, California Glass offers imported bottles from many European manufacturers, providing both stock and private molds.

California Glass maintains the largest sales and support staff in the western U.S., specifically to serve the wine industry. Technical service representatives are available to respond on short notice to troubleshoot line difficulties. An in-house graphics department can, in conjunction with graphics design companies, turn art work into a printed box with minimum lead time. California Glass offers an extensive product line, including wine glasses, label adhesives, polylaminate capsules, and corks. For over 70 years, California Glass has built its reputation and client relationships on service, performance, reliability, and integrity. Now, and in the future, look to California Glass for superior service and products.

For more information, contact:
California Glass Company
tel: 510/635-7700; fax: 510/635-4288
• For domestic wine bottles,
contact Guy Gianino at x169
• For imported wine bottles,
contact Cindy Silvani at x122
• For corks, capsules, and adhesives,
contact Kim Murphy at x159
• For stemware, contact Karen Stanley at x162
• For cartons and graphics,
contact Sheila Abbe at x124
Pacific Coast Container, Inc. (Wash.)
tel: 360/892-3451; fax: 360/892-4955
Carlen Company, L.L.C (Colorado)
tel: 303/730-2501; fax: 303/730-2923
Columbia Packaging (British Columbia)
tel: 604/465-7694; fax: 604/465-1702

PACTUCO, INC.

Pactuco announces the arrival of the new Universal Wine Shipper. This new expanded polystyrene (EPS) shipper will safely ship the various styles of wine bottles used throughout the industry. The base and lid hold bottle sizes from 750ml still wine bottles to slender Riesling bottles to the widest Champagne and sparkling wine bottles. These new Universal Shippers are sold in 1-, 2-, 3-, 4-, 6-, and 12-Pak shipping units.

Pactuco offers the most popular 12-Pak CUFL shipper and magnum-sized shippers (1-, 2-, 3-, and 6-Pak units). Pactuco has competitive pricing within the wine packaging industry, and has exceeded the highest quality standards for more than 25 years. You will find Pactuco fully equipped and stocked, and able to satisfy all your wine shipping requirements.

In addition to this line of wine shippers, Pactuco can be your point of contact for all your custom packing containers, including holiday gift packs and special occasion promotional containers. With its in-house manufacturing capabilities, Pactuco has the technology and experience to create a wide array of custom packaging containers. Pactuco is a prominent leader in the plastic thermoforming and EPS molding industry and is prepared for any custom packaging requirement.

For more information, contact:
Pactuco, Inc.
PO Box 599, Lompoc, CA 93438
tel: 805/735-1339, ext. 48; fax: 805/736-4684

Please see our ad p. 30.

GORDON GRAPHICS

Gordon Graphics is a long-time supplier of high-end labels to the wine industry. The company's quality standards long ago became the benchmark for the industry. This is why today's foremost designers bring their most challenging work to Gordon. They know that quality and service must go hand-in-hand in order to produce complex packaging for an ever-evolving marketplace.

To that end, Gordon has modernized its plant with the finest printing and foiling/embossing presses, and the recent installation of electronic prepress equipment allows the company to bring to market the latest designs of the modern age. Gordon employees are among the best in their fields, keeping abreast of the latest technological developments in the printing industry, not the least of which is in the area of protective coatings.

Gordon Graphics is proud of its reputation for putting the customer first in every area of the operation. The company feels that this attitude is one of the contributors to its success and to the success of its customers.

For more information, samples, or a plant tour, contact:

Gordon Graphics
15 Digital Dr., Novato, CA 94949
tel: 415/883-0455; fax: 415/883-5124

Please see our ad p. 46.

WALNUT HILL CO.

Walnut Hill has developed a special wax blend for use in sealing bottles. Bottle Seal-1 gives a tough, moisture-resistant coating to preserve freshness and flavor, and gives tamper-evident protection to your wine. It can be applied by capping the cork or dipping the top of the bottle. For capping applications, the cork is depressed about a quarter-inch below the top of the bottle, and a small amount of wax is applied to seal the cork and the bottle. With a corkscrew, the cork and wax seal can be easily removed together.

Artistic effects can be achieved with dipping applications. The bottle can be held at an angle when placed in the wax, or a second dip can be made in a different color to enhance the appearance. With either capping or dipping applications, the wax can be stamped for a unique presentation.

Bottle Seal-1 is formulated with waxes and colors approved by the FDA and the FDC. It is available in quarter-pound cakes in eleven colors: black, blue, burgundy red, holiday red, green, purple, yellow, silver, gold, white, and uncolored. Custom colors can also be furnished.

For more information, contact:

Walnut Hill Company
PO Box 599, Bristol, PA 19007
tel: 800/NEED WAX or 215/785-6511;
fax: 215/785-6594

Please see our ad p. 28.

SUPREMECORQ, INC.

SupremeCorq® is a synthetic closure made from a thermoplastic elastomer, a high-grade synthetic material used in many medical applications. It will not break in the bottle, seals immediately, prevents leakage, and helps eliminate tainted wine.

UPREME
South, Kent, Washington 98032 Telephone (206) 656-4160
Napa, California 94558 Telephone
To Order 1 (800) 794-4169
CORQ

Approved by the FDA, SupremeCorq is available in virtually any color and can be customized with printing, allowing customers a broader range of packaging options. Corks can be coordinated with bottle or label colors. Customers have done away with foils by using flange bottles and colored SupremeCorqs with printed logos.

SupremeCorq is currently being used by more than 80 wineries in the United States, Chile, and Australia. In addition, several hundred wineries throughout the world are in various states of testing the product for market release.

SupremeCorq is manufactured in the United States and is recyclable.

For more information, contact:

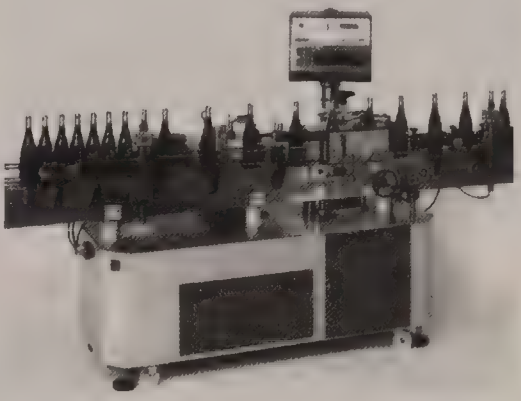
Scott Laboratories, Inc.
2220 Pine View Way, Petaluma, CA 94954
tel: 707/765-6666; fax: 707/765-6674

or SupremeCorq, Inc.
19039 62nd Avenue S., Kent, WA 98032
tel: 206/656-4160; fax: 206/656-4169

Please see our ad p. 25.

TAPP TECHNOLOGIES INC.

Tapp Technologies Inc. has been successfully converting glue label customers to offset-quality pressure-sensitive labels for over three years. In that short time, the company has installed over 30 Impresstik applicators into the west coast wine industry.



Tapp Technologies Inc. has won 35 international awards for technical excellence in pressure-sensitive label printing, including the 1996 World Label Association's Best in the World Award.

Tapp Technologies Inc. offers: 24-hour label production on three large presses; a separate quality control department; an in-house digital prepress department; a full-time Impresstik applicator service engineer; region-designated customer service representatives and sales staff. The three senior production manager's combined label printing experience is over 70 years.

Get offset-quality labels with the production and marketing benefits pressure-sensitive labels provide. Check out cost-effective Impresstik pressure-sensitive applicators with labeling speeds from 10 to 350 bottles per minute. Talk with the leaders in pressure-sensitive wine labels.

For more information, contact:

Tapp Technologies, Inc.
tel: 1-800-533-TAPP

RWH PACKAGING SERVICES

RWH Packaging Services, located in Oakland, CA, is a stocking distributor of premium wine corks, as well as polylaminated and PVC capsules. Stock capsules in many colors are readily available for immediate delivery. Custom-printed and decorated capsules can be produced and turned around quickly.

RWH is the exclusive distributor of the Pop-Cap (patent pending), which is a one-piece perforated PVC capsule designed for flange and bar-top finish bottles. It can be applied with standard winery equipment and offers great advantages: it's tamper-evident, easily removable, and pops away from the perforation leaving a clean pouring surface every time.

For more information, contact:
RWH Packaging Services
700 Independent Rd., Suite B
Oakland, CA 94621
tel: 510/530-9067, in CA 800/530-6888;
fax: 510/530-9068
Please see our ad p. 36.

JUVENAL DIRECT

Juvenal Direct is a joint venture between two of the most sophisticated cork companies in the world: Juvenal Ferreira da Silva of Portugal and Rudolf Ohlinger GmbH of Germany. This partnership has created an American company that embodies a clear vision of the future of wine corks: top quality, careful analysis, continuous research, and responsive service.

Juvenal Ferreira da Silva is one of Portugal's leading cork producers, certified to meet the quality standards of the European Union through ISO-9002 certification. The company has sold its corks throughout the world of wine, with major markets in Germany, France, Italy, the United States, and Australia.

Rudolf Ohlinger GmbH is the innovative leader of the German cork industry. The company's work with Dr. Jens Jaeger of the SLFA Research Institute in Neustadt and scientists at BASF in Ludwigshafen has resulted in a series of important technical improvements in cork analysis and production.

These two have joined forces with a tremendous team in America to create a new kind of cork company — one that not only provides top quality corks, but also provides the information, research, and service that wineries need to take full advantage of those corks. This approach will define the future of corks in America.

For more information, contact:
Juvenal Direct
PO Box 5449, Napa, CA 94581
tel: 707/254-2000; fax: 707/642-2288
Please see our ad p. 27.

PRO PACK SYSTEMS, INC.

Pro Pack Systems, Inc., of Salinas, CA, has worked diligently over the past 18 months in developing its Wax Lock™ capsule-free cork closure into a production reality for some of the state's leading wine producers. Fetzer Vineyards, Kendall-Jackson, Chateau Julien, and Wente Bros. are among Pro Pack's up-and-running clientele, and all are realizing benefits of market appeal, cost savings over other methods ($.005 to .01 per bottle wax cost!), and trouble-free application.

Pro Pack will supply all the ingredients to ensure a successful switch-over to Wax Lock, including the applicator and bottle control systems, the brilliantly colored, application-specific FDA-approved waxes, and the experience that is so essential to making it work in your winery. Call today to learn more about how Wax-Lock can benefit you.

For more information, contact:
Pro Pack Systems, Inc.
1354-T Dayton St., Salinas, CA 93901
tel: 408/771-1300; fax: 408/771-1303
Please see our ad p. 13.

RLS EQUIPMENT CO.

Now available from RLS Equipment is the VKN Polux capsule. Polux is a high-quality polylam capsule finished with the techniques used for tin capsules. Lacquering the basic capsules after wrapping and decoration covers the overlap and top disk seam beautifully.

Polux capsules are half the price of tin and can be fully customized. Top embossing decorations are crisp and clean, colors are intense, and overlap seams are virtually undetectable. Polux capsules are easy to spin down — without wrinkling, and delivery of smaller quantities is available.

Tin capsules are available in standard sizes or as shoulder caps. A capsule with a shoulder (27-29mm vs. 28.75 mm) approximates the contour of the bottle from mouth to band. It rests better on the bottle, spins down better, and ensures wrinkle-free application. The shoulder cap also provides for better manual and mechanical separation.

Standard capsules are available in 20 colors or capsules can be produced in custom colors to match label designs.

Polylams and PVCs are also available in 20 standard colors (shiny and matte finishes). Either type of capsule can be customized to provide the finishing touch on your packaging design.

RLS and VKN can also assist you with the design of your custom capsule, starting with computer sampling and ending with a finished optical sample.

For more information, contact:
RLS Equipment Company, Inc.
PO Box 282, Napa, CA 94558
tel: 800/527-0197 (West Coast);
609/965-0074 (East Coast)
Please see our ad p. 17.

APM INC.

APM Inc., a major international distributor of glass bottles, corks, foils, and colored wax has formed an alliance with Corporate Vintages, a producer of etched and hand-painted wine bottles. APM can provide an unlimited choice of corporate logos, customized greetings, or fine art work on wine bottles to display in tasting rooms.

This elegant engraving can help increase sales to corporate clients who use these bottles as a marketing tool.

"This collectible art will showcase a winery's vintages," says APM Inc. president Bill Preston, "increasing its marketability, especially in a tasting room. There is an endless range of designs that can be translated to etched and hand-painted wine bottles, which creates more reasons to purchase wine. It's an excellent way to increase wine sales."

The marketing idea has been endorsed by such industry leaders as Gallo and Seagram's Classic Wine Co. Corporate Vintages is currently working on a program with Seagram's featuring Major League Baseball designs that will be available for national distribution.

Corporate Vintages was started in 1984 by Stephen Stanley. Corporate Vintages has opened new facilities in Vancouver, BC, and is relocating its California facility closer to Napa Valley.

For more information, contact:
APM Inc.
441 Industrial Way, Benicia, CA 94510
tel: 800/487-7555; fax: 707/745-0371

LONGVIEW FIBRE CO.

Longview Fibre is a totally integrated corrugated packaging and paper products company with a mill and 15 plants in the U.S., including Oakland, CA. Company sales exceed $900 million annually.

Dedicated to giving your products the greatest consumer recognition possible, Longview's graphic package team helps customers achieve maximum buyer attention for their products through cost-conscious "billboard" type multicolor graphics and creative, product-protective structural design.

Longview experts include team-oriented sales and marketing personnel; an excellent customer service team; in-house graphics and structural design teams; and a prepress graphics team.

State-of-the-art equipment includes a fully automated computer design center equipped with Macintosh and PC hardware. Graphics design software includes Adobe Illustrator, Quark Express, Photoshop, and Freehand. Structural design software includes AEI Cad Cam. A Laser Master color printer (36"x100"+ for full-size mockup packaging and displays) and Konsberg 70"x115" automated sample-making table let you see your graphics package before it's printed.

The latest Flexo multicolor direct print equipment; multicolor Flexo folder/gluers; rotary and flat multicolor die cutters; specialty folder/gluer for displays, gift-pack shippers, etc.; and the latest Mitsubishi corrugator, with E and F Flute available, all ensure the final package will be produced properly.

Longview also offers a convenient Oakland location; preprint capabilities; laminating litho labels to single face; aqueous and UV coating; certified Q-1, Quality, and SPC programs maintained in plant; and delivery anywhere.

For more information, contact:
Longview Fibre Co.
8511 Blaine St., Oakland, CA 94621
tel: 800/821-8982; fax: 510/569-8958
Please see our ad p. 21.

NO BROWNING

NO PINKING

Polyclar® V and Polyclar® VT selectively remove polyphenols, the precursors which cause wines to discolor. Polyclar then filters out completely, without affecting flavor or bouquet. For technical assistance and/or samples, call 1-800-323-2272. Outside the U.S., call 708-932-4022. To place an order, call ISP Customer & Sales Service at 1-800-522-4423. For information on the Accurate Filter Bag System, call 1-800-944-6336.

ISP
INTERNATIONAL
SPECIALTY
PRODUCTS
GAF

Duarte Nursery invites you to meet California's best

Vineyard Service Team

The Duarte Nursery Big Pot Benchgraft is the best option for your vineyard. Our Vineyard Service Team is the best option for you.

Each member of our Vineyard Service Team is experienced and qualified to serve you. We will meet you at your vineyard to assist you with:

- Vineyard site and soil analysis
- Vineyard design
- Rootstock and scion selection
- Preplant preparation
- Vine care and establishment

Please call us for service before, during and after planting.

Call **Markus Bokisch** at (209) 531-8414 for service in Napa, Lake, San Joaquin, Yolo, Sacramento, Solano and Sierra foothill counties.

Call **Stephan Daniels** at (707) 484-8517 for service in Sonoma, Mendocino, Monterey, San Luis Obispo, Santa Maria and bay area counties.

Call **John Duarte** at Duarte Nursery (209) 531-0351 for service in Stanislaus, Merced, Madera, Fresno, Kings and Kern counties or anywhere.

DUARTE NURSERY INC.

1-800-GRAFTED

HUGHSON, CALIFORNIA

CORK SUPPLY USA, INC.

Cork Supply USA (CSU) provides a number of different corks to the wine industry: Alpha™ (hydrogen-peroxide washed), Natura™ (potassium metabisulfite washed), and traditional (chlorine washed). CSU represents Champcork whose corks are cleaned in the patented ABC-1 autoclave process. These corks include sparkling wine corks and Futura II™ agglomerated corks with natural cork disks.

CSU is the founding member of the Cork Supply Group. Other companies include Cork Supply Australia (CSA), a cork laboratory and processing facility in South Australia; Cork Supply Portugal, the group's new manufacturing facility; and Global Cork, the quality control laboratory also in Portugal.

The Cork Supply Group provides customers with an integrated system of quality control worldwide. It is thoroughly involved in all aspects of wine corks: sourcing the raw cork, manufacturing, quality control, processing, quality assurance, and customer service.

Global Cork's staff is highly trained in cork grading and sensory evaluation, and all corks must pass rigorous testing before shipment. This service is also provided for wineries who purchase corks directly in Portugal. Extensive laboratories and experienced QC staff continue the evaluation process at both CSU and CSA.

Modern manufacturing, washing, and processing equipment enable the group to assure its customers of consistent, superior quality corks. CSU is a founding member of the Cork Quality Council.

For more information, contact:
Cork Supply USA, Inc.
537-F Stone Rd., Benicia, CA 94510
tel: 707/746-0353; fax: 707/746-7471

Please see our ad p. 4.

SOTO ASSOCIATES

Soto Associates is a full-service advertising and design firm providing marketing communication solutions, including: advertising, label design, collateral, point of sale projects, and more. Regardless of the size of the project, Soto's goal is to provide work that is effective. The company focuses on developing creative designs and clear messages that work together to get you results.

In business since 1979, Soto has worked with consumer and technical firms promoting various products from food to networking hardware. Soto can be this diverse because its strengths rest in its design and communication skills. Regardless of the message or audience, the key to effective communications is developing a clear message and design that people understand immediately.

Services include: art direction, design, illustration, copywriting, photo direction, and project and vendor management. Because it is a full-service firm, your creative concepts and messages are applied consistently to all your materials. Soto also offers strategic thinking in implementing your creative solutions. You'll find that fees are competitive, and the approach is fresh. Soto's experience with smaller and larger companies gives its staff understanding for the concerns of each.

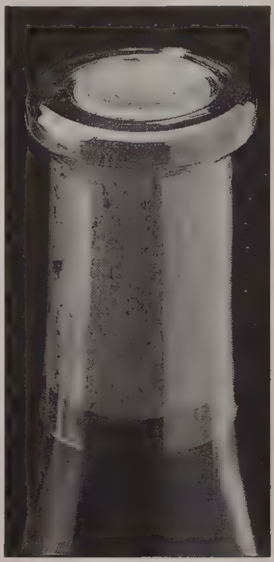
Whether it's a single label or an entire product line, Soto can help you stand above the rest. The firm's philosophy is to take its work very seriously, make it effective, and have fun at it. Otherwise, life is just too short.

For more information, contact:
Soto Associates
97 S. Second St., #200, San Jose, CA 95113
tel: 408/288-7686; fax: 408/288-7720

Please see our ad, page 45.

MAVERICK ENTERPRISES, INC.

The Maverick Capsule gives your package the marketing effect of a flange or bar top finish while providing tamper evidence and cleanliness.



If you are considering a flange-type or bar top glass finish or are currently using one, consider the following: Is your packaging truly tamper-proof? Can the cork be removed with a disc or wax decoration still on top and then reinserted? Who is handling your bottle of wine before it is presented to the consumer and how clean are their hands? On the shelf, dirt, dust, fly eggs, and other matter collect on top of the glass finish and settle into the crevice next to the cork making the bottle top very difficult to clean before serving. When the cork is removed, does debris fall into the bottle?

Maverick offers high quality, clear, PVC capsules, with a 20mm top disc, which covers only the cork area. The capsules are available in various sizes, to fit most bar top and flange finishes. These capsules can also be printed on the bottom of the skirt to simulate a neck band making them very cost-effective.

In addition, Maverick offers various opening features such as one-, two-, or even three-row perforations in different patterns, as well as tear tape and tabs. To find out more about having "the best of both worlds" and how Maverick capsules can protect your investment, give Maverick a call.

For more information, contact:
Maverick Enterprises, Inc.
751 East Gobbi St., Ukiah, CA 95482
tel: 707/463-5591; fax: 707/463-0188

DEMPTOS GLASS CORP.

Demptos Glass is a company which prides itself on providing niche-market packaging to the wine industry. It has always been a market leader in presenting new items to the trade.

The company recently introduced a line of its own stock molds that are unique in shape and color. These are available in cork finish or a variety of flange finishes.

Demptos has the capability to meet small to large bottling needs. The stock ranges from 37.5cl to 27 liters in traditional and very unique shapes. Spear labels are available and pressure-sensitive wine labels can be applied at Demptos' Napa Valley facility.

In addition to providing oversize corks, capsules, and wax for large format bottles, Demptos can work with you to develop proprietary molds. The company portfolio includes the first flange bottle released by Robert Mondavi Winery — the Carneros Reserve. Schramsberg's "J.Schram," Domaine Chandon's "Etoile," and Mumm Napa Valley's "DVX" were also developed by Demptos.

The experienced team at Demptos is ready to provide you with packaging ideas for existing products as well as new.

For more information, contact:
Demptos Glass of California
840D Latour Ct., Napa, CA 94558
tel: 707/224-1000; fax: 707/252-3437
Demptos Glass Corp.
3651 Collins Ln., Louisville, KY 40245
tel: 502/394-9298; fax: 502/394-9109
Demptos Packaging
22648 Glenn Dr. #106, Sterling, VA 20164
tel: 703/742-9105; fax: 703/742-9106

Please see our ad, page 2.

NAYLOR WINE PACKAGING

Wine Packaging by Naylor can help increase your wines sales with attractive, practical packaging. For the first time, even small- to medium-sized wineries can buy small lots of boxes at reasonable prices. Since shipment can be made directly from Naylor stock, delivery to you will take only two to four days by UPS.

New for 1996, Naylor introduces The Ultimate "Wine Cradle" System for shipping UPS with two-, four-, six-, and twelve-bottle shippers. Naylor also stocks one- and three-bottle shippers; one-, two-, three-, and four-bottle gift boxes; two-, three-, four-, and six-bottle carriers; plus several other specialties. These include counter display gift boxes and shippers for six 187ml bottles, plus UPS shippers for 187ml, 375ml, and six or twelve bottles of champagne, as well as for one, two, or six magnums.

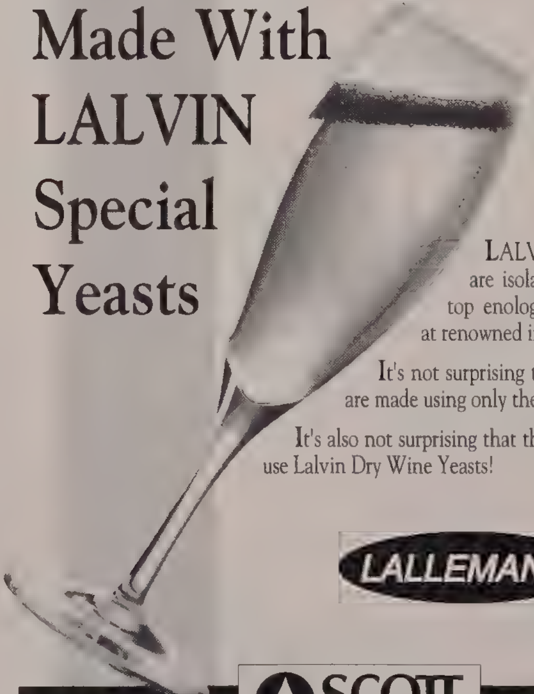
Tell Naylor what you need and the staff will get it for you. Naylor custom-designs to your specifications and offers printing on larger orders. You can be confident that your orders will be handled promptly and efficiently and the product will be of the highest quality. Dick Naylor's 30 years as a packaging executive and his involvement as a winery owner and director of the American Vintners Associations assure you of this guarantee.

For more information, contact:
Wine Packaging by NAYLOR
RD #3, Box 424, Stewartstown, PA 17363
tel: 717/993-2431, 800/292-3370;
fax: 717/993-9460

Please see our ad p. 76.

Watch for PWV's
September/October SHOWCASE OF
PROFESSIONAL SERVICES
Featuring accounting, architectural, compliance, construction, consulting, engineering, financial, insurance, laboratory, legal, personnel, real estate, wine brokerage

LALVIN
The Finest Wines Are Made With LALVIN Special Yeasts



LALVIN dry wine yeasts are isolated and selected by top enologists and researchers at renowned institutes.

It's not surprising that the finest wines are made using only the finest ingredients.

It's also not surprising that the finest winemakers use Lalvin Dry Wine Yeasts!

LALLEMAND

SCOTT LABORATORIES
2220 Pine View Way • P.O. Box 4559 • Petaluma, CA 94955-4559
707-765-6666 • Outside CA Call 800-821-7254
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Classic combos with Long Island Merlot

DUCK AND TUNA

by Eleanor & Ray Heald

John Ross, chef/owner of Ross' North Fork Restaurant in Southold, NY, believes that locally raised Long Island duck is a classic match with Long Island Merlot. He sources from a duck farm in Aquebogue on Long Island's North Fork.

Boneless Roast Long Island Duck with Long Grain Wild Rice and Plum Sauce is a signature dish on his restaurant's menu daily. The preparation leaves the duck crispy, adding a textural element, and when served with a Long Island Merlot, the sauce augments the subtle plum character Ross finds in the Merlot fruit profile.

"Long Island Merlot is very approachable and an easy match with food," Ross explains. "I'm particularly attracted to 1993 Long Island Merlots. They are richer, beefier, more concentrated, extracted, and richer wines overall. Certainly bigger wines than 1992.

"Using Cabernet Franc as a blending varietal has improved depth, complexity, and richness and has made Long Island Merlot an easier match with food. In the last few years, the quality of Long Island Merlot has improved dramatically. The wines are more full-bodied, intense, with bigger flavors and good acidity balance."

Duck Cake with house-made Fruit Chutney is one of Ross' original appetizer specialties. It's basically a crab cake recipe that has been converted into a duck preparation. Fruits in the chutney vary seasonally, but generally include apples, pears, raspberries, and raisins spiced with cinnamon and clove. Although, Ross does not find these specific fruits or spices in Long Island Merlot, he says they enhance the cherry and red fruit components that are perceptible in the wine. The duck cakes have no fat or skin, only pure roasted duck meat with the bindings.

"On the palate, Long Island Merlot is perceived as a wine with higher acidity and lighter mouthfeel without overwhelming alcohol or ripe, jammy fruit concentration," Ross explains. "Duck needs a red wine with higher acidity to cut through the fat."

White before red

In his restaurant, Ross encourages a by-the-glass pour of a Long Island white wine or half-bottle of French white when people are considering a red with an entrée. "Long Island Merlot always shows better, either on its own or with food, after people have had a glass of white wine," he maintains. "Actually, I think this experience may be more significant than attempting a perfect food and wine match."

Ross expands this concept further by adding that his focus is on the whole meal, not just on the food and wine. "I make wines look good with my food, but the wines make my cooking look good because the whole dining experience is better with wine."

When a dish is assembled, Ross says, a chef looks for contrasts in taste, texture, and appearance. These are the same elements that he looks for in matching food and wine. A plate must have tastes that contrast *and* tastes that complement.

Ross illustrates using fruit, such as the plums with the duck. Fruit usually adds a unique contrast to a meat, firm-fleshed fish, or duck. It freshens the food and counteracts any perception of too much fat. It also adds color and some different textural feels on the palate.

Wine is part of the fabric of taste, texture, and appearance. Perhaps the wine and the food do not have a direct relationship, but when put together with a contrasting/complementing element, such as a fruit, the wine and food marriage works.

Other options

Ross' menu also includes a number of fish dishes, and he identifies tuna, especially his Tuna Steak au Poivre, as another excellent match for Long Island Merlot. The tuna is pan seared with peppercorns, flamed in brandy, and served with a cream and mustard sauce. In general, Ross believes that peppercorns overwhelm any red wine, but the richness of this dish with the heavy cream, mustard, and textured tuna temper the peppercorns and keep them from being perceived as too peppery.

Tuna is is a good match because it's richer than other fish and is more suited to a red wine than a white.

As a third suggestion, Ross offers Boneless Pork Filet, grilled and finished in the oven, served with mashed potato and baked apple. The preparation includes caramelized onions and rosemary, which Ross says, play on the oak complexities in the wine. The version of cream-whipped potatoes varies, from plain to garlic or green onion, depending on the type of potato seasonally available or simply chef's pleasure of the day.

Because boneless pork filet is a very lean cut, its lightness pairs well with the approachable, less tannic, lighter body of Long Island Merlots. Pork is more dense than chicken and makes a better Merlot match than any poultry selection aside from duck. Ross adds richness, which he says is necessary in a good match with Merlot, by using a veal reduction sauce in his preparation. It enhances the meaty and juicy qualities of pork for better palate acceptance.

Seasonal choices

Ross serves fresh farmstand vegetables with all dishes. For diners interested in meatless options, he prepares an all-farmstand vegetable dish, often accompanied with wild rice or pasta.

He believes this dish is quite versatile and matches well with Long Island Merlot.

While some may believe that certain wines and foods are seasonal, Ross says, Long Island Merlot is chosen equally by diners in summer and winter, and duck sales are brisk even on the steamiest summer days. "There is no adverse relationship between weather and red wine and heavier, more savory dishes, such as duck," Ross confirms. "Wines, foods, and their harmonies are not seasonal."

Wine pricing

PWV congratulates Ross on his wine pricing which is only double the wholesale cost. The wine list is limited to Long Island and French wines.

Ross reports wine sales volume is very good. His house wines have a Proprietor Rouge or Proprietor Blanc label that has been registered. The white house-blend is made by Hargrave and the red (100% Merlot) by Lenz. Ross is involved in blending the wine with the winemaker, and the house blend is not sold elsewhere.

Each night, the wine list features a Long Island Merlot by the glass. When a wine is on special, Ross offers better pricing on a full bottle. Regardless of producer, the featured wine is $19 for the bottle or $5 per glass. Ross' Proprietor Rouge (Merlot) is $16 per bottle and $4.50 by the glass.

Long Island Merlot as a cooking medium for fish.

RECIPE:

Fresh Rainbow Trout in red wine sauce

Cut boneless trout into fillets, removing heads and tail. Season with salt and pepper. Place in oiled baking pan, skin-side up. Barely cover with Merlot. In saute pan, quickly cook pearl onions and mushroom caps in butter or oil (about six onions and four mushrooms per fish). Add to trout. Place baking pan in hot oven (425°) until trout is cooked (about five minutes). Remove skin of trout by peeling back with small knife. Plate trout and onion and mushrooms on warm plates. Reduce wine. Add a little brown stock if desired. Finish with cold butter and pour over fish.

The Merlot gives trout a more robust style than white wine, especially with Burgundian garnishes. Wild rice is good accompaniment along with a bottle of Long Island Merlot.

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IMPROVING YOUR TASTING ROOM

Part III

Trade visitors, display, and special events

When you're dealing with trade visitors to your winery, you must use an entirely different approach than you use with the general public. Too often, wineries give no attention to the fact that these folks have different expectations and goals for their visit, and since their function helps you sell wine, you want to make their visit successful.

Giving trade visitors a slightly modified version of your general visitor tour is insufficient. This was brought home forcefully to me early in my career when I gave a group of chefs a tour. Afterwards, one of the chefs came up to me and said sarcastically: "You know, I've been on tours for three days now, and all of you guys have the best grapes and the best techniques and the best wine. It gets old hearing the same thing everywhere."

I realized then that I always need to tailor the tour to the group and, most important, show *points of difference* between my winery and other places.

The tour I would give to a food and beverage director would have to be different than the tour I would give a group of sales reps, for example. An important part of sales is having a story to tell. Reps need anecdotes and sales tips for the next time they call on a customer. They don't generally need details on acid and pH.

There are, of course, overlaps: both food and beverage directors and sales reps need to know what your banquet wines are and why they are the best. But you need to address each group differently — even within type. For example, the tour and tasting for a group of New York City sales reps would differ from that for reps from a small midwestern city.

Here are some general suggestions for trade groups:

1. Unless it's their first time in the wine country, try to avoid things that are mundane. How many stainless steel tanks can they look at in a three-day visit?

2. Learn to play to your audience. If it's a group, ask the tour leader what the knowledge level is. If only part of the group is knowledgeable, give a tour and tasting that addresses both groups. Or, if visitors look tired, prune your information down and mention that you are doing it to accommodate their fatigue. They will love you for it. Other visitors will want all the time you have for them.

3. Keep it brief. Of course you want to maximize your time with important buyers, but recognize that if you keep them too long, they'll remember you for the wrong reason. They're probably going to lots of wineries and any topic, even sex, gets boring after a few ten-hour days.

4. Do different things. Take them fishing in your reservoir with a picnic afterwards. Use live music. Let them blend wines. Remember: we're trying to enlighten as well as entertain.

5. Take them to local restaurants. This practice allows them some choice in their meals and helps keep your wines on the list at the restaurants. If you're entertaining at your winery, try to find out ahead of time what they will have for their meals at the two wineries they visit before yours. Many's the time I've had trade visitors tell me: "I've just had lamb three times in a row."

6. Try to have someone on your tasting room staff help out with local sales, so you look good on local wine lists. Buyers and sales reps check for this. If you're not respected in your own backyard, why should they respect you? In addition, I've done local sales, and I firmly believe it helped me do a superior job with sales groups. I knew more about what they were going through on a daily basis — which made my tour and tasting more effective.

7. Think of information that will help sales reps. For example, they may be carrying a wine of yours that is in demand and severely allocated. When they mention that retailers are complaining about this fact, you can say: "I'm sorry about that," or "You might want to tell them that even at the winery, we limit that wine to one bottle per customer. As an employee, I only got two bottles." The latter statement will prove much more useful when they return home.

8. Don't just focus on the buyers and ignore their spouses. This oversight is guaranteed to lose you points with the buyers. Determine the knowledge level of the spouse or other non-trade people in the group and play to them as well.

9. Give the trade visitor as much new information as possible. Maybe you're about to change labels or release a new varietal. Telling the trade visitors about this fact will help them anticipate the changes and have them feeling like insiders.

10. If there is any way you can provide lodging at or near the winery or in the vineyards, do so. It really makes your facility a much more desirable destination.

11. When the trade visit is being booked, try to get as much information as possible: Is the visitor from a steak house or seafood restaurant? Is he or she the manager or a waiter? Which of your wines do they carry? Does the sales rep or distributor want you to emphasize any particular wines?

In addition, developing a personal profile of the visitor (including hobbies) can be very helpful. Is the visitor outgoing or shy? Wine knowledgeable or not? Oriented more toward sports or cultural events? Developing a profile will allow you to quickly and easily make your trade visitor more comfortable.

12. Another way to ease your task: The role of host, always carrying the weight of the presentation and conversation, can be very tiring. Remember — all of us like to talk about ourselves and voice our opinions. Ask questions, such as: "So, how did you get in the restaurant business?" or "What do you think the supermarket wine business will be like in five years?"

With this approach, you'll lift some of the conversational burden off your shoulders. What's more, I've picked up a lot of useful information about on/sale and off/sale from trade visitors in their musings on the wine business.

This is just a small sampling of the ways you need to address the trade visitors. Essentially, your goal is the same as with general visitors; you want them to return home with better memories of you and your winery than those of your competitors.

Savvy merchandise display

Display plays a crucial role in sales. Barry Wiss, director of hospitality at Sutter Home Winery in St. Helena, CA, increased his sales by 24% in one year largely through a change in display tactics. "You have to maintain the character of the region," says Wiss. "What will your guests expect when they visit, a department store or winery/country store atmosphere? Try to maintain an unpretentious tone. Decorate with earthy agricultural items, such as wine barrels, antique winemaking equipment, old knobby grapevines, dried herbs hanging from the ceiling."

Wiss also believes in centrally locating your tasting area with a good view of your entire room. Another tip is: "Keep your guests looking up. Try to avoid placing reading material on the bar. Install a chalkboard or other changeable signage above and behind the bar. The more your guests look up, the more likely they will find something to talk about and buy. In addition, the chalkboard is a useful tool for announcing specials, discounts, club programs, and other things."

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Displays need constant attention throughout the day in order to keep them full and clean. "If someone sees a sampling area for a pasta sauce which is messy," says Wiss, "it doesn't inspire them to buy."

On busy days, stand and observe the actions of your guests. Focus on *hot spots* (areas that people are drawn to) and *cold spots* (areas they avoid) and adjust your displays accordingly. This last point is very important because hot spots can get overcrowded easily.

I have traditionally put book displays in cold spots because people like to linger there to browse, thereby alleviating some of the over-activity at a hot spot.

When you consider the essential component of lighting, track lighting still remains one of the best choices. Wiss agrees: "Our track lighting allows us flexibility. We're constantly adjusting ours to focus on different areas."

In addition, the importance of signage must never be overlooked. It is a crucial part of your display mix. In the past, professional-looking signage was an expensive proposition. However, most wineries now possess computer graphics software and ink jet printers that can quickly create in-house versions of colorful and interesting signage on a wide variety of papers, complete with logos and up-to-date information.

Sell more with special events

Handling special events is a real art form. One of the best artists in the business is Jennifer Lamb, director of hospitality at St. Clement Vineyards, also in St. Helena. Special events generally fall into three categories:

1) Special events for trade groups (discussed earlier).
2) Special events for general winery visitors.
3) Special events for private groups.

Producing special events for general winery visitors is one of Lamb's specialties: "We recently had a Blues Winter Open House in January. I advertised it locally and let our newsletter folks know about it as well. In addition to a blues band, we had lots of appetizers (including ribs), tours, and wine tasting featuring a vertical selection of older Merlots."

These events help sell more wine and serve as an excellent tool to keep old and new customers in touch with Lamb's tasting room. She also recommends involving local organizations who are looking to raise funds. "For example, your high school jazz band is trying to fund a trip to the state big band contest. The teenagers in the band can help with setup, clean-up, and other general work in return for a donation to their cause." She further notes that this contribution is a tax-deductible donation.

Corporate dinners, weddings, and other events for private groups can be a great source of winery revenue and a good P.R. tool as well. Lamb recommends that you first check your use permit to ensure compliance with local ordinances.

Make sure you have someone who is delegated to work with the customers to handle details. For example, if you chose to do weddings, your staff person has to be prepared to deal with nervous brides/bridegrooms and their parents.

Don't neglect to keep a list of approved caterers. When someone books your facility, you should charge them a flat rate for its use, your staff time, and the wine. But have the customer deal directly with the caterer about price and menu. You will then be able to avoid being the intermediary who has to resolve the last minute crisis: "Oh, I forgot to tell you that two of our people are lacto-vegetarians, and they'll need a special menu."

Lamb also believes strongly in using live music: "I like music and so does my staff — so we try to include music as much as possible. The guests really appreciate the band and it makes it more fun for everyone."

In Parts I through III of this series, we've explored the policies and staffing of your tasting room as well as how to make the most of a guest's visit to your winery. In effect, we've assembled a theater with first-rate performers who know how to entertain and inform an audience. But wouldn't it be wonderful if you could still keep selling the audience popcorn long after they've left the theater? In Part IV, we'll do just that — by reviewing direct mail programs for your customers. ■

Craig Root is a 25-year veteran of the wine and hospitality business, including 15 years at Beaulieu Vineyard. He has worked in all capacities at hospitality centers, primarily as manager. For the past three years, he has also served as a consultant for visitor centers through his own company, Craig Root & Associates.

HOW DIFFERENT GRAPE AND JUICE TREATMENTS INFLUENCE WINE QUALITY

by Dr. Rainer Jung, Dipl. Ing. J. Seckler
Geisenheim Research Institute
Forschungsanstalt Geisenheim,
Germany

Grapes harvested from the vineyard contain all of the substances that influence wine quality. Grape and juice treatment — starting with harvesting techniques, transport, and acceptance of grapes and continuing with pressing — are the main factors which influence the quantity of compounds contributing to wine quality. During these activities, berries can be damaged to varying degrees, juice may be released, and many chemical and microbiological reactions begin.

Pressing is the main process by which grape juice and solids are separated. During this process, extraction of phenols which affect bitterness increases. Most of these compounds come from the stems, seeds, and skins. Increasing mechanical damage to the grapes results in higher solids in the juice, and we extract more negative substances affecting wine quality.

In many wine-producing countries, modern harvest, transport, and crushing techniques have been accepted because they improve economic efficiency and make the process easier. Today, quality is paramount. Quantity is secondary in an international and occasionally glutted wine market. Careful grape and juice treatment which minimizes problematic substances in the wine should be a primary goal of modern winemaking.

For the last few years, the Enology Department of the Geisenheim Research Institute has practiced pressing whole grape clusters (no crushing). This article reports our experiences and results, comparing "conventional" grape treatment (crushing) with the pressing of whole, undamaged grapes.

Experimental plan

The "conventional" grape treatment in the Geisenheim winery includes: Hand picking → transport in 800L containers → emptying of containers by forklift into a receiving hopper with a conveyor and electronic scale → worm- type pump (It is important that conveyer and pump have the same output capacity to avoid mechanical damage of grapes in front of the pump.) → into crusher → pressing (1,800L pneumatic press).

The process for pressing whole grape clusters includes: Hand picking → transport in 800L containers → weighing → emptying of containers by forklift directly into the press → pressing (1,800L pneumatic press).

In this experiment, the press program in both techniques was the same:

- Total pressing time 2.5 hours,
- Separation of free run juice (FR),
- After free run juice, the pressing started at 0.2 bar for ½-hour (P1).
- After this P1, we increased the pressure in seven intervals with inflation times from 240 to 300 seconds, up to 2-bar (P2).

Through pressing and further mechanical stress from loosening the press cake, the total phenols rise yet again. The pressing of whole grapes reduces the phenols by 10% to 35%.

The three fractions, free run juice, P1, and P2 were separated into three lots, and a fourth lot was made of proportional amounts of those fractions (according to the juice output of each fraction). To judge the effects of the different techniques, the following parameters were analyzed.

- quantity of juice solids
- pH and acidity
- tartaric acid
- sugar content
- total phenols (analyzed as total phenols [Folin-Ciocalteu])
- potassium and calcium
- percentage of output press capacity
- wine sensory evaluation

CONVENTIONAL GRAPE TREATMENT

Filling the press

We first analyzed the technique of filling the press. A 1,800L pneumatic (open-style membrane) press was filled through a central axial feed.

For the first test, we had a very ripe Riesling with 25% rotten/botrytised grapes, an amount which is not unusual for our region. We got some very interesting results comparing filling through the door with filling through the axial feed. If the press was rotated once every two minutes, we got 32% more grape material into the press and 35% higher solids in the juice! With constant rotation, we could get 6% more grapes into the press, but produced an increase of 57% more solids!

These results demonstrate that the free run juice flow without any pressure and with a rotating press produces higher levels of solids because the filtering effect of the cake is absent.

Pressing sequence

Following are the percent output and elapsed time of different press fractions: While filling the press through the door for a period of 15 minutes, we extracted the free run juice, which constituted 55% of the total output; for the next 30 minutes, we pressed with 0.2 bar (P1), yielding another 27%; the last 18% of yield required 75% of the entire press time (P2)!

The solids content decreases during the pressing time. In the free run juice, we had 33% solids; at the end of the operating program (last fraction), we observed 3.2% solids due to the filtering effect of the cake.

The reduction of the total phenols in the juice is important in producing wines with desirable odor and taste. Grape variety, condition of grapes, maturity, and treatment of grapes and juice determine the content of total phenols. Actually, any mechanical operation can increase the total non-soluble solids, and therefore the total phenols of the juice and can cause bitterness and disharmony in the wine.

After most of the juice is separated from the stems and skins in the press, the mechanical and enzymatic release of skin compounds increases.

Potassium and calcium are highly concentrated in the skins, much more so than in the pulp. This explains why we found more of these elements at the end of the press program. In addition to the increasing content of potassium and calcium, we found a concomitant increase in pH and decrease in acidity.

We also found that the juice at the end of the press sequences had a higher sugar level. In tastings we recognized that the wine made from the free run juice was very clear but had too much acidity; it was nearly sour. The last fraction had off-flavors (bitter, grassy) which diminished somewhat after storage (two years).

In preference tastings done by our panel at Geisenheim, the blends of all fractions always were judged as the best quality wine. Table I summarizes all data from the conventional pressing of Riesling.

PRESSING OF WHOLE CLUSTERS

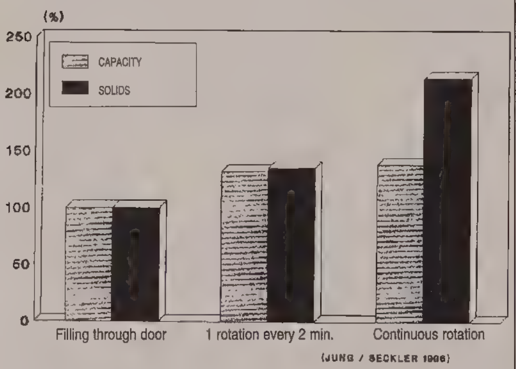
Fig. 2a and 2b show the juice yield and solids levels of the different press fractions, comparing "conventional" with "pressing of whole clusters." Solids were measured after 18 hours settling time.

The solids content of the juice from the

Table I: Output and content of different press factions with Riesling

RIESLING (conventional)	**Free run** 15 min.	**P1** (0.2 bar) 30 min.	**P2** (2 bar) 120 min.	**BLEND**
Press capacity	2,885 Kg			
Output of must (L) / (%)	1,200 / 55.6%	590 / 27.3%	370 / 17.1%	2,160 / 100%
Output total	81.1%			
Solids (weight %)	2.90%	1.65%	0.96%	2.19%
Solids (vol. %)	33%	7.5%	3.2%	17.8%
Total Phenols (mg / L)	323	376	468	366
Potassium / Calcium (mg/L)	1,270 / 96	1,628 / 127	1,972 / 164	1,512 / 122
pH/Total Acidity (g / L)	3.0 / 11.1	3.1 / 10.8	3.4 / 9.3	3.1 / 10.7
°Oe / Sugar (g / L)	82 / 197	83 / 196	84 / 193	83 / 196

fig. 1: Press capacity and solids Riesling (depending on filling technique)



(JUNG / SECKLER 1996)

fig. 2a: Output from different press fractions (influenced by grape treatment)

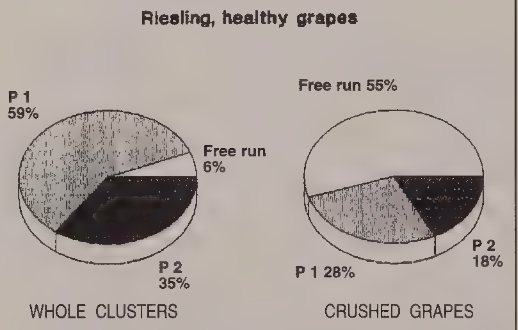


fig. 2b: Solids from different press fractions (influenced by grape treatment)

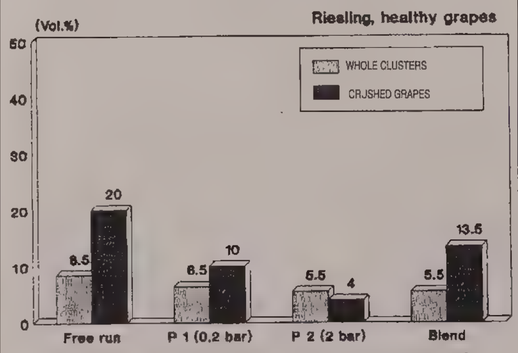


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fig. 3: Solids after pressing/different varieties (influenced by grape treatment)

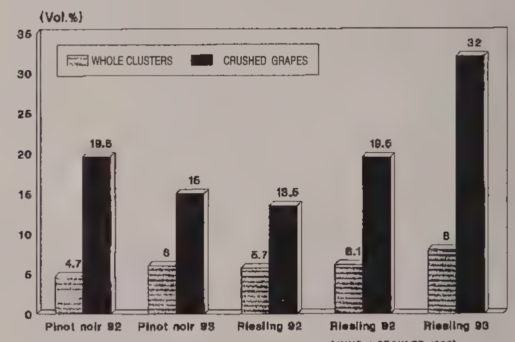

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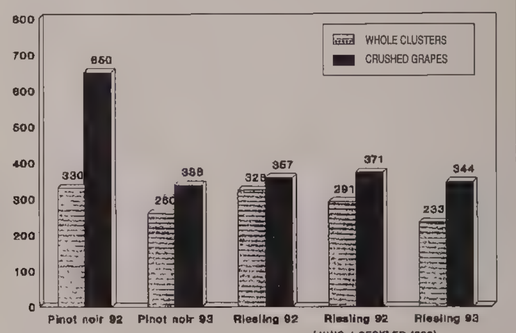
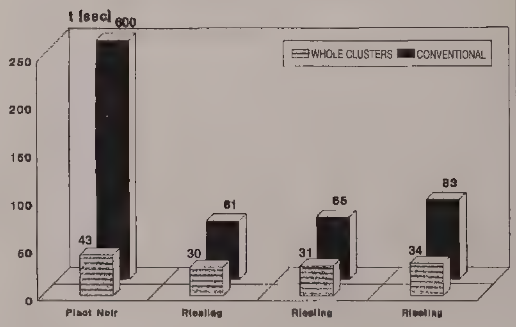
fig. 4: Total phenols after pressing (influenced by grape treatment)



(JUNG / SECKLER 1996)

fig. 5: Filtering efficiency of wines made from whole cluster pressing / conventional



Time for 180 ml Wine / 2bar
3,0µm mit 20,3cm2 Filter

whole clusters is comparable to that achieved by a traditional vertical basket press. The free run yielded 6% of the juice. The low volume resulted from the very slight crushing effect of the weight of the grapes themselves. At 0.2 bar (P1) of pressure, we got 60% of the total output! Because of the lower volume of free run juice, we were able to yield 35% from the last fraction (P2), double the output by crushing/pressing.

Phenolic content comparison

Two parameters influence the total phenol content in our trials: mechanical treatment of the grapes and time.

A certain amount of phenols is very important to express the varietal character of wine, but an excess makes the wine bitter and unharmonious. Fining of the finished wines can only be an unsatisfying remedy for defects which could have been avoided by controlling phenolic extraction at an earlier stage of the winemaking process, in our opinion.

fig. 6: Influence of different clarification techniques on solids in juice

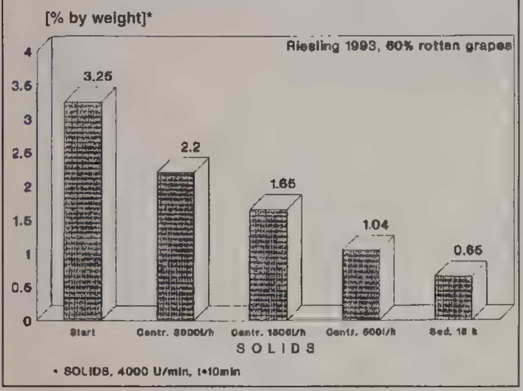


fig. 7: Influence of different clarification techniques on solids

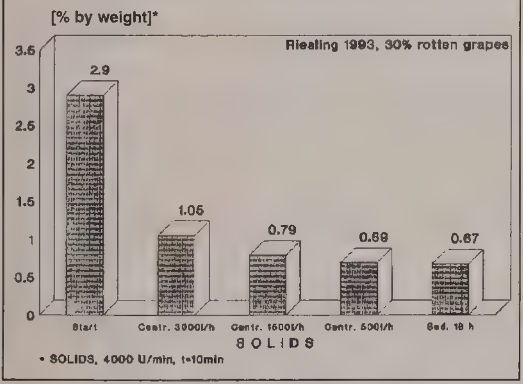
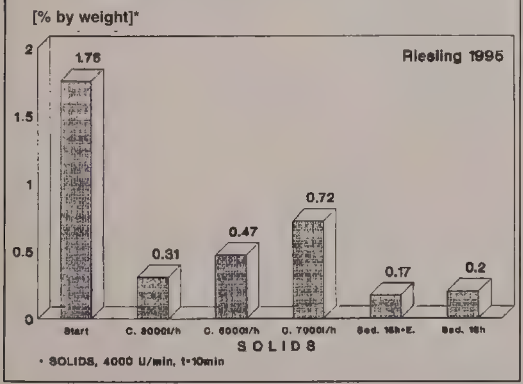


fig. 8: Influence of different clarification techniques on solids in juice



> *The juice from whole clusters has (depending on the variety and condition of grapes) 60% to 75% lower solids.*

Intensive mechanical treatment of crushing and pumping makes the total phenol content rise. Through pressing and further mechanical stress from loosening the press cake, the total phenols rise yet again. The pressing of whole grapes decreases the phenols by 10% to 35%. (See fig. 4).

In the literature, we read that higher levels of potassium and calcium are indicators of mechanical damage on the grapes, since these compounds are located in the skins. In our experiments, we also found an increase with ongoing pressing time, but the potassium content for whole-cluster pressed grapes was not higher than that in the conventional method.

We compared the total yield from the two techniques of the different varieties and vintages. The total output of juice from a Pinot noir (rosé) in 1992 was very low, a consequence of the fruit condition (80% rotten fruit, Botrytis, dry berries). The juice from the conventional method had 0.4° Brix more (because of extraction in maceration), and the juice from the pressing of whole clusters had lower solids and phenols, which made the wines clearer and more characteristic.

In some cases, we had an even higher yield from whole cluster pressing. A second Riesling from 1992 had 50% rotten fruit. The analysis of the press cake after pressing showed the reason for the higher output of juice: the stems from the conventional pressing of the cake were very compact, whereas those from the whole-cluster pressing were porous and loose. Thus higher yields were due to easier drainage provided by the loose structure of the press cake.

Conclusion and further results

The juice from whole clusters has (depending on the variety and condition of grapes) 60% to 75% lower solids.

The juice and wines made with whole-cluster pressing have 10% to 35% lower total phenols.

A disadvantage of the whole cluster method is decreased press capacity. In pressing whole clusters, the capacity of the press is reduced by 40% to 60%.

With whole cluster pressing, the fermentation may progress a little slower because the juice, with lower solids, contains fewer small particulates, which means a lower inner surface area for the CO_2-release and less substance to keep yeast suspended and to support biomass. We recommend an addition of 10 to 20 g/hl yeast and a fermentation temperature around 20°C.

If a high percentage of rotten and botrytised fruit is processed, the wines made from whole cluster pressing can be filtered more easily.

The wines were judged in triangle tests in different tastings. The testers could find significant differences in every comparison. Qualitatively, the wine made from pressing whole grapes was always judged "better." These wines were described as being younger and cleaner with more fruit and grape varietal character.

JUICE CLARIFICATION

Another enological technique that is very important for wine quality is the clarification of juice. This can be done in different ways. To compare the efficacy of the centrifuge against settling, we made several tests in our winery. A preliminary result is shown in fig. 6.

We started with a juice with 3.25% solids by weight. Using a centrifuge with a capacity of 8,000L/h, we could reduce the solids to 2.2% when we operated at the rate of 3,000L/h. At 1,500L/h, we reduced it to 1.65%, at 500L/h we came down to 1.04%.

Even with this drop in efficiency, we could not get to the 0.85% solids which we had after 18 hours settling! Fig. 7 shows a comparable but not as extreme example of the same effect. The difference was the condition of the grapes. The grapes in fig. 6 were 60% rotten/botrytised while those in fig. 7 were only 30% rotten/botrytised.

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These examples show that, to make efficient use of a centrifuge on difficult juice (shown in fig. 11), we have to decrease the output. In a juice from healthy fruit, the varying output efficiencies of the centrifuge don't make much difference relative to the level of clarification.

Experiments in 1995 with another centrifuge (max. 8,000L/h) showed comparable results. The solids (in fig. 8) are shown for this Riesling from healthy grapes. In 1995, the centrifuge showed very good results, even with high outputs. Any solids under 1% are very acceptable for cleaner fermentations and higher quality wine.

> *With constant rotation, we could get 6% more grapes into the press, but produced an increase of 57% more solids!*

Summary

During the last six years, we experimented with grape and juice treatment at the Institute of Enology in Geisenheim. In grapes from different varieties, fruit conditions, and vintages, we could see that the minimizing of mechanical damage to the berries decreased the solids content in the juice significantly. Also improved were the total phenols, potassium, acidity, and pH profiles. As a further step, the clarification of juice by settling showed very good results compared to different outputs from a centrifuge.

The wines made from whole-cluster grape and juice treatment were in all cases more typical of their varieties and in several tastings judged better by the panelists. ■

Edited from a presentation at Wine Spoilage Microbiology Conference on March 8, 1996, California State University, Fresno, CA.

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by R. Corbin Houchins

Such a lovely dress . . . Sincerely

In the United States the term is "trade dress." In Canada and the United Kingdom it's "get up." In other parts of the world it goes by locutions like "the totality of signs rendering a package capable of indicating its source." By any name, if successful it attracts imitation.

A working (if not legally precise) definition of wine trade dress is the combination of non-functional package elements, apart from the brand name, that causes a commercially significant association in the consumer's mind. The association can be vague or explicit.

Vague association suggests only that wines with a given trade dress are comparable in some way, though not necessarily from the same source, such as Bordeaux shape versus Burgundy shape bottles. Stronger association might be created by the color and shape of a label border used only by one winery. If the association is so strong that it distinguishes the goods from those of any other producer — *i.e.* causes the consumer to believe that wine wearing a particular trade dress comes only from a particular source — the trade dress functions as a trademark.

Is it property?

How far trade dress is protected by law remains disputed among trademark attorneys and academics, but the answer is important for wine package design and brand management in the 1990s.

Trade dress with trademark significance can be protected like any other trademark in many countries, including the U.S. The company that first uses a trademark has the exclusive right to use it for the product category, both under statutes protecting registered marks and under the somewhat looser law of unfair competition.

On traditional principles, a trademark owner can prevent competitors from infringing the mark by use of confusingly similar marks. With trade dress, however, trademark infringement may be more difficult to gauge, as it is sometimes unclear which elements on the package make up the mark.

As a general principle, functional features or generic design elements cannot serve as trademarks. The industry would have a real problem if one winery could obtain trademark protection for an array of packaging items virtually everyone uses. Nevertheless, the law is not entirely settled on the degree to which components that are individually ordinary can, when combined in a distinctive way, collectively achieve trademark significance.

The issues have become even more complex now that national "anti-dilution" statutes found in most major countries, including the U.S. since January of this year, suggest that famous trade dress may be protected across all consumer goods, not only in the product line where it achieved fame. [See **PWV** March/April'96, page 56.]

To complicate matters further, the issues do not end with trademark analysis. An ongoing argument in the trademark community is whether trade dress copying that does not constitute trademark infringement may nevertheless be illegal as unfair competition.

Horse races

Recently a prominent difference of opinion erupted, in the form of a lawsuit by Kendall-Jackson (K-J) Vineyards against E. & J. Gallo Winery over the latter's "Turning Leaf" line. The suit illustrates much of what is controversial under current legal rules related to package design.

The issues in the K-J case involve both "straight" trademark infringement and trade dress. The practical question raised by the trade dress elements is, assuming a winery has developed a label with a logo or name its legal counsel believes does not infringe the trademark on a competitor's label, is it still risking suit if the label goes on a package whose overall impression is arguably similar to the competitor's.

Courts analyze claimed infringement of unregistered marks as possible unfair competition. Unfair competition is a somewhat amorphous group of frowned-upon marketing practices, the classic example of which is "palming off" — trying to induce consumers to believe they are getting genuine Brand A goods when they buy Brand X.

Plaintiffs who sue over trade dress that is not itself a registered trademark attempt to establish a monopoly on the "total impression" of the package by characterizing competition via packages with similar impressions as unfair. To bolster the argument, it is common to allege other unfairness, which is a slippery enough concept to produce frequent disagreement.

Sorting it out

Most of the litigation over trade dress involves what some people call "knock off" or "look-alike" packaging. Aggressive plaintiffs argue that the similarity of total impression is enough to establish illegality without proof that the consumer was likely to be confused or deceived about whose wine he or she was buying.

Where does the legal line lie in getting close to the overall aesthetic effect of a competitor's package?

What, if any, are the legitimate uses of packaging that is designed to evoke the "impression" of another company's product without confusing anyone as to the actual origin of the goods?

In the suit, K-J complains about vigorous merchandising, "directly targeting" the plaintiff and adoption of Turning Leaf, instead of the Gallo name, as the brand. Is it illegal to "target" another brand in package design and shelf adjacencies? Do you increase the chance of being sued if you use a different bottling name for a new product line aimed at a competitor?

Legal counseling makes an important distinction between what is lawful and what is so clearly lawful that not even a sore-head could argue otherwise. Well-advised companies do not ordinarily compete up to the limit of the law unless there is a good reason. Prudence dictates taking less than one is entitled to if the risk of lawsuits outweighs the benefits of aggressive marketing.

A company with no particular desire to pit its product against a specific competing product will ordinarily want a package design that steers clear of dispute. The usual objective is a brand name distinctively different from all others in the industry and trade dress that does not call to mind a specific counterpart in the market place. To that end both names and package appearance need legal clearance — that is, a trademark lawyer's opinion that it is safe to adopt the proposed brand name and graphic elements.

Legal opinions are personal judgment calls based on examination of the proposed package elements and a search of the names and graphics that are probably ***not*** available to the client because others are currently claiming them as their trademarks. In some cases design patent searches are required as well.

Legal clearance of words used as trademarks is relatively easy because one can search trademark records with a computer to find combinations of letters related to brand names, brand owners, and other key concepts anywhere in an entry, not just by first letter indexing.

Computer searching of graphic elements is somewhat less reliable (and more expensive) because it depends upon human indexing of records according to the appearance of the mark and usually produces a higher percentage of irrelevant material. Trademark clearance searches for the combination of graphic and other elements making up trade dress are difficult indeed.

Trademark searching of any kind should be supplemented with information from trade journals and street knowledge. That kind of market information is essential for trade dress clearance, but even with a honest effort it is possible to be blind-sided.

Risk factors

Even in murky legal waters, there are some procedures you can adopt to reduce risk in your packaging decisions:

Survey the marketplace carefully to be sure your total package doesn't resemble anything out there. Even off-the-shelf capsule colors and details, or apparently commonplace decoration on corks or strip labels, can add to the total impression in combination, so be sure to compare complete packages.

Use a distinctive and legally cleared brand name that is prominently displayed.

Get legal clearance on the significant individual graphic elements of the package, then promptly register ***individually*** both your brand name(s) and each commercially significant graphic element of your package that is distinctive as your trademarks with the U.S. Patent & Trademark Office. Discuss with your legal adviser whether an additional application to register the ***combination*** of elements making up trade dress would be beneficial.

Truth or dare

So much for the risk-averse. But what if you want to go after an entrenched competitor by all legal means?

Except when done with evil intent by a company with unusual market power, targeting a competitor is, from a legal standpoint, mainstream free enterprise competition of the kind that is lauded at Rotary Club meetings. It's not the targeting, but the confusion potential that matters where package design is concerned.

Packaging is an important weapon in the battle between established brands and upstart brands. The main battlefield is the supermarket shelf, where discount or house brands often are displayed alongside famous brands in packages with similar colors and general layout. The *brand name* is completely different, although if the major brand has an old-fashioned name that includes generic elements (like "Suda" in a brand name for a product whose generic name is a chemical beginning "pseudo"), you can be sure the corresponding generic word will be prominent on the upstart package.

I'll call the tactic "me-too" packaging, which may be more neutral than "knock-off." The intent is to call the consumer's attention to the newcomer's claim that it is to be compared straight across to the leading brand.

Is cheeky illegal?

The essence of me-too packaging is ***not*** to confuse the consumer about origin, but to make it clear that a product from a different source is playing in the same league as the established product and deserves consideration as an alternative at the moment of purchase decision.

Naturally, the practice makes established brand owners furious and generates litigation. The court cases have not, however, established a bright line. At bottom is a philosophical split in the legal community about the nature of trademarks as intellectual property, leading to unpredictable judicial results and opinions that offer little practical guidance.

The upstart contingent argues that exclusive rights in words and other symbols are an exception to the traditional and beneficial Anglo-American encouragement of vigorous competition and should therefore be defined as narrowly as possible. In that view, the trademark owner enjoys only so much protection as is essential to prevent consumer confusion about who stands behind the product.

The heart of me-too packaging is the instant when the consumer thinks, "Isn't that ... ? No it isn't, but I'll try it." At least one court has sanctioned the practice by finding that prominent placement of a house brand name on me-too packages was a defense to a trademark infringement action.

Established brand owners contend that the intellectual property involved in a trademark, including distinctive trade dress capable of indicating origin, is more like other kinds of property. They spend great sums to maintain and improve it, and don't want someone else picnicking on the lawn.

Several courts have suggested that profiting from the senior brand's goodwill, with only a fleeting moment's consumer uncertainty as to source, is unfair competition. Others have ruled against the me-too package with ***no*** evidence of likelihood of confusion because they found the defendant intended to "trade on" the target product's reputation.

Brinkmanship

So what is the cheeky competitor to do? Despite judicial uncertainties, some practical guidelines emerge:

- First, don't introduce me-too packaging if your objective is to profit from the other product's luster. The only even arguably legitimate reason is to tout your own virtues more effectively.
- Be able to make a strong case against confusing similar-

ity, with the two packages side by side, although from a legal standpoint a court should examine the real-life background against which the packages appear. Do not place too much reliance on the fact that elements in common may be used by many others in the industry. To a juror who has never before looked at a wine bottle, the first two he or she examines will seem a lot alike, even if you later show that in an industry-wide context there is no significant similarity.

- Never simply copy anything. In some courts, intentional copying is taken of proof of likelihood of confusion. Moreover, label elements can also be protected by copyright. Even the me-too parts should be independently designed and show some originality.
- Limit imitation to functional parts of a package wherever possible (after ascertaining they are not utility patented). Features that serve purely utilitarian roles are generally not protected from competitor imitation, although distinctive configurations of utilitarian components are.
- Your brand name should be prominent and a country mile away from looking or sounding like anything on the target package. If a significant feature of the competitor's label is a picture of a duck, don't use "Duck" in your brand name or label copy, even if the word doesn't appear on the competitor's package.
- Be sure promotions and merchandising don't add elements of confusion. In federal courts covering part of the country, trade dress is defined as a product's "total image," including "sales techniques."
- Don't compound problems by imitating the target company's advertising! In the recent Solichnaya Cristall vodka case, the court sank the me-too brand in large part because the defendant's intent to compete unfairly was shown by its slavish copies of the Stoll print ads. ■

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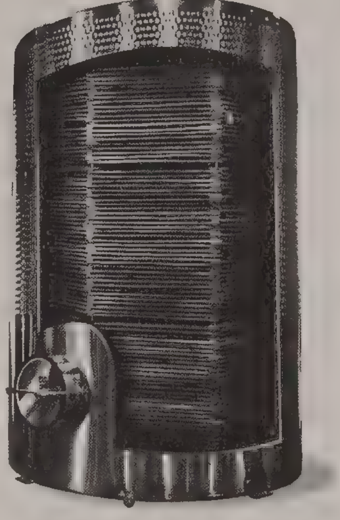

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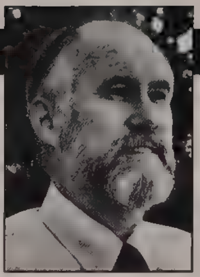


What's cool and new in underthings

A shirt that keeps you cool? Sounds improbable, but that is what the Exothermal Technology Corporation is claiming for its "KoolShirt."[1] The product was originally developed to protect soldiers — loaded down with flak jackets and other essentials of war — from heat prostration or heat stroke.

The KoolShirt is worn next to the skin to facilitate heat transfer to the proprietary material that is contained in the core of the KoolShirt, the "KoolPack." Two temperature levels are available, 65°or 75°F.

The KoolPacks act as a "heat sink," and the core material is initially in the solid phase, changing to a gaseous state as heat is absorbed. The cooling effect can last for 2.5 to three hours, depending upon ambient temperature, according to the manufacturer.

The "Packs" are easily regenerated by immersing them in ice water. At approximately $200 each (1996 price levels), they are affordable, but not inexpensive.

Over the years, I have been in hot situations, where I would have appreciated such a device. El Centro, CA, in July with the thermometer hovering at 115° to 120°F is a good rehearsal site for hell's eternal fire and the KoolShirt.

Equatorial heat plus high humidity can wilt the most macho of men and reduce to an absolute minimum the will to do anything more strenuous than sip a cold drink. Poorly scheduled athletic events, that coincide with high noon are also tests of human endurance.

In my younger days, I was required to perform on tennis courts that were so hot the glue that bonds the sole to the upper portion of my tennis shoes lost its chemical properties. It would be the height of tennis match psychology (there's always a lot of "psyching" that goes on in tennis matches as opponents try to unnerve each other in any way possible) to wear a KoolShirt under an oversized tennis shirt and remain very cool, while your opponent is losing one-half liter per hour of body fluids during an active singles match. I could almost guarantee a 6-1, 6-0 victory.

Later summer heat and grape harvest seem to go together, but salt pills and lots of water work pretty well for most wine industry people. Thank God, the grape harvest system is self-correcting for temperature extremes, because every vintner wants his/her fruit as cold as possible at picking for a number of essential enological reasons.

Night harvesting and limiting daylight picking times from sunrise to 10:30 a.m. seem to achieve this objective. Still, it's part of our **PWV** *staff job to keep readers abreast of new developments, and if you're into ergonomics big-time, you would most surely want to be the first person on your block to sport a KoolShirt.*

Waterless bathroom fixture can save gallons

New plumbing technology is often fraught with operational problems. First generation hydraulic design shortcomings and high-traffic installations put the device to the ultimate test, providing the basis for improved second generation models.

The waterless urinal, in its simplicity, seems to avoid the pitfalls of new technology and, wonder of wonders, it doesn't require a pentium chip or microprocessor.

How it works

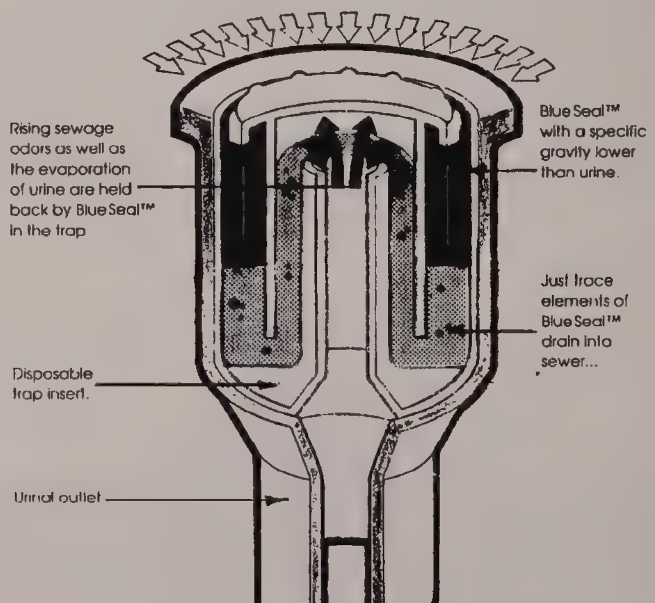
The waterless feature of the urinal is possible because a specially designed trap insert allows the urine to pass through a sealing liquid product that has a lower specific gravity than water. fig. 1 shows a section of the patented trap unit and its key operational features.

In principle, the system operation depends upon the differences in unit weight of the two liquids which allows the passage of the lighter urine through the heavier sealing liquid. It is similar to the magic that some bartenders can create with colored liqueurs of different specific gravities that are present in a glass as an unmixed rainbow of colors.

The fiberglass urinal bowl has not been overlooked in the overall design concept. The bowl is treated with a hydrophobic, anti-bacterial, protective coating to prevent nuisance odor formation, because of the absence of conventional flushing water.

Finally, the waterless urinal system meets the American National Standards Institute (ANSI) requirements for plumbing fixtures; ANSI Standard A112.19.2M and ANSI Standard Z124.9.

Figure 1
Sectional view of Plastic Trap Insert
(Adapted from Reference 2)


Rising sewage odors as well as the evaporation of urine are held back by BlueSeal™ in the trap
Disposable trap insert.
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Applications and economics

Wineries with limited water supplies are generally the rule and not the exception. How, for example, can a winery reduce water consumption for sanitary flushing purposes? (See **PWV** Winery Water & Waste column Sept-Oct 1990, Vol. XI, No. 3. "National Legislation for Water Conservation.")

Having plumbing fixtures that require only 1.5 gallons per flush saves at least 50% over the pre-conservation ethic, three gallons per flush water wasters. But having a urinal that uses no water whatsoever is a water conservation feature that is difficult to top.

The capital cost for a waterless urinal is about the same as for a conventional urinal with a flushometer valve (3 gallons or more per flush with multiple flushes possible for fastidious users). Published cost (1995 price levels) for a complete unit (not installed) is $595.[2] The average cost (not installed) for a urinal and flush valve (1995 price levels) is about $653. Incidental annual operational costs for the plastic trap insert and trap sealer, would amount to approximately $26 per year.[2]

Water savings

If a winery was retrofitting the older type, three gallon per flush units, with the waterless type, the potential water savings would be equal to the number of male employees times the number of urinal uses per day times three gallons. If the urinal being replaced was of a 1.5-gallon water conservation model, potential water savings would be one-half of the previous calculation.

Return on investment would depend upon the relative scarcity of water at the winery, but return of investment period of one or two years could justify the conversion to waterless units. ■

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1. Personal Communication, 1996. Exothermal Technology Corp., Palm Bay, FL (1-800-991-KOOL).
2. Anonymous, 1995. "No Flush Urinals." Waterless Corporation, White Plains, New York (1-800-786-9564).

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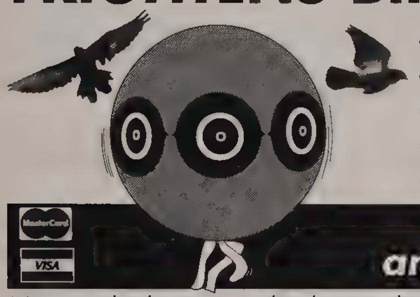

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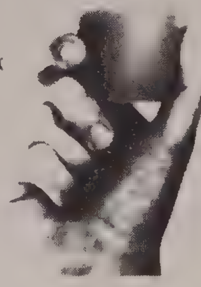

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Continued from page 5

close row spacing (4.5 to 5-ft.) and wide vine spacing, because the canopy was not dense, yet the vine number per acre was high.

Shaulis also carried out studies on shoot positioning, which found that by positioning all shoots vertically downward, the proportion of basal leaves in deep shade decreased from 42% to 9%. This is because when shoot direction is uncontrolled, the shoots tend to grow horizontally along the canopy top and cause much shading. The higher the vine vigor, the greater is this effect.

Microclimate measurements showed that interior leaves receive only 1% to 10% of the light level of exterior leaves. Such low light levels would cause reduced photosynthesis and reduced fruit maturity. In the cool New York climate, leaf and berry temperatures were increased to more beneficial levels by exposing them to sunlight.

GDC is conceived

At the conclusion of these experiments, Shaulis understood the basic biology necessary to allow him to develop a new grapevine training system. Vine spacing within the row should be large to allow wider shoot spacing and avoid canopy shading, and shoots should be trained vertically downwards to promote their exposure to sunlight. This would improve photosynthesis by increasing leaf temperature and illumination. Also, illumination of the basal part of the shoots is enhanced, causing greater bud fruitfulness.

Similarly, row spacing should be reduced to provide a larger surface area to capture the energy of sunlight and thereby promote yield. Shaulis realized that this would require major changes to existing vineyard machinery, and so he tried to create the yield benefits of narrow rows with the convenience of wide rows.

His answer, of course, was to divide the vines horizontally to create two feet of canopy for each foot of vine row. Shoot number per vine was doubled without increasing shading. Canopy division is now well-known, but the idea was revolutionary at this time.

Response to GDC training

The first GDC was installed in an experiment in 1962 and compared to Concord vines trained to the common Umbrella Kniffin training system and to a single curtain. Yield was increased up to 90% with no negative effect on fruit ripening.

GDC was found to promote a higher percentage bud break as well as bunch number and bunch size. Avoiding shade provided the expected benefits — increased yield and normal fruit maturity.

Few people realize that some of the first machines to harvest and prune grapevines were developed by Shaulis and his engineering colleagues during this period. Reports on mechanical harvesting by Shaulis, E. Shepardson, and J. Moyer were published as early as 1960, and the machines were soon adapted to GDC. There were also early commercial developments in shoot positioning machines in New York state.

Continued

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Adoption of the GDC

Ironically, the GDC has been more widely adopted in Italy than in New York. As previously discussed in this column (***PWV***-May/June'95), Professor Intrieri's adoption of the GDC affected the mechanization of both winter and summer pruning and harvesting in Italian vineyards. There has also been less adoption of GDC in winegrape vineyards of California and Australia, and it is interesting to consider reasons why.

Vineyard managers cite reasons of extra cost and labor required, but I think these are more often supposition than fact. Those few persons in Australia and California who have applied the system to vigorous vineyards and have managed them well have demonstrated increased yield and wine quality. The vineyards were more profitable than otherwise trained. GDC vineyards can now be harvested with several commercially available harvesters, and hand-harvest costs are also reduced, compared to other trellis systems where the fruit is less accessible.

Undoubtedly there remains a stigma about Shaulis' work in the minds of many because he worked with Concord grapes in New York state. Few people were prepared to concede that vinifera vines in warmer climates would respond in the same way. Sadly many researchers around the world were of similar opinion, and the system has not been as widely evaluated as it might.

I wonder how different California viticulture might be had Nelson Shaulis been a Professor in that state.

Salutation

It is now 34 years since the GDC was first used. This occurred before man walked on the moon. Why are we so slow in taking up good technology? When I recently spoke to Professor Shaulis about the development of this system, he said, "It seems to me that today's viticultural world is practice-dominated. Had we used this approach, the GDC may never have been developed. Rather, our approach was diagnosis-dominated." Food for thought for young researchers and viticulturists.

Professor Nelson Shaulis, we salute you and your Geneva Double Curtain! ■

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Shaulis, N., E. Shepardson, and J. Moyer. 1960. *Grape harvesting research at Cornell*. 1. Proceedings N.Y. Horticultural Society, 250-254.

Shaulis, N., H. Amberg, and D. Crowe. 1966. Response of Concord grapes to light exposure and Geneva Double Curtain training. *Proceedings American Society for Horticultural Science*, 89, 268-280.

Dr. Richard Smart, "the flying vine-doctor," is an international viticultural consultant, accessible in Australia by fax on 011-61-65-84-0121, or by e-mail on smartvit@midcoast.com.au. He visits America frequently and can be contacted at Vinquiry in Healdsburg, CA at tel: 707/433-8875.

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- There will be tourism and rest opportunities in Buenos Aires, Santiago, Valparaiso and two crossings of the spectular Andes, by road and by air.
- The tour will take place from 11 to 25 November including travel time and rest days.

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Tuesday/Wednesday, October 29-30

1996 Wine Industry Financial Symposium

Silverado Resort - Napa, CA.

Robert Smiley, dean of the U.C. Davis Graduate School of Management, will deliver the Wednesday keynote speech addressing how industry members can develop positive long-term strategies to maximize profitability during the current positive wine business cycle and beyond. Smiley will also present results of the Fifth Wine Industry Financial Survey of wineries, growers, distributors, and retailers.

The symposium begins Tuesday, October 29, with a series of concurrent seminars on topics such as consumer-direct shipments, tasting room sales, wine sales on the Internet, long-term grape supply strategies, and valuing wineries for sale or succession, will be offered in the afternoon, followed by a VIP reception and dinner.

On Wednesday, Bob Trinchero, president of Sutter Home Winery, will give an insider's perspective, focusing on the significant growth of Sutter Home Winery over the last decade. He will discuss the role of advertising and cross-promotion of wine and food, as well as some thoughts and ideas on what lies ahead for Sutter Home and the wine industry.

George Vare, president of Napa's Luna Vineyards, will moderate a panel addressing the consumer demand for wine and exploring the role of industry-wide and winery advertising to build and maintain "brand equity."

Tom Eddy, winemaking consultant and Napa winery owner, will lead a discussion on the grape supply focusing on the current shortage of premium wine grapes (especially Merlot) and what growers and wineries are doing to keep up with demand.

There will be a discussion on "How wineries and growers can attract equity," followed by small, in-depth discussion groups of various related topics.

A wine tasting and reception, hosted by members of the financial community, will conclude the program.

For more information on the 1996 Wine Industry Symposium, contact: Krissy McLoughlin, Allegra Colombo, or Kathy Archer at the Symposium office, tel: 800/927-6272, or 707/255-9222.

Wednesday, Nov. 13

Napa Valley Viticultural Fair

Napa Valley Exposition, Napa, CA

Event is a one-day trade show and education forum for the winegrape industry featuring new and innovative products for grapegrowers and winemakers. The fair is organized by the Napa Valley Grape Growers Association, Napa Valley Exposition, and Napa County U.C. Cooperative Extension. Sponsors include Napa National Bank, Ren Harris & Jean Phillips-Land Brokers, and Brotemarkele, Davis and Murray, CPAs.

For information on becoming an exhibitor or participant, contact the Napa Valley Grape Growers Association, tel: 707/944-8311.

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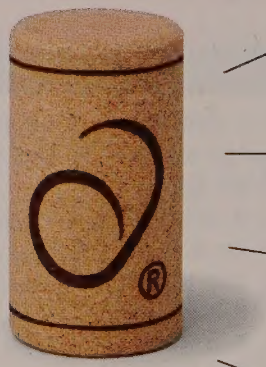

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